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THESIS

**COOPERATIVE RESEARCH AND DEVELOPMENT
AGREEMENT (CRDA)**

by

Scott Alexander Morgen

September 1993

Thesis Advisor:

Rodney Matsushima

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AGREEMENT (CRDA)**

by

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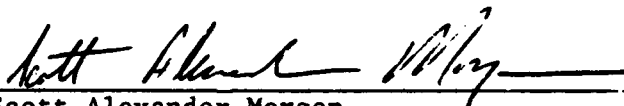
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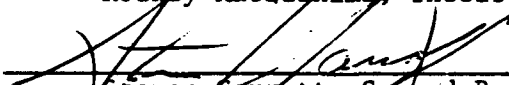
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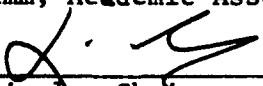

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ABSTRACT

The topic of this thesis is the Cooperative Research and Development Agreement (CRDA), a method employed to transfer technology from Government Owned, Government Operated (GOGO) laboratories to private industry. The unique aspect of the CRDA is it provides an avenue for Government researchers to negotiate agreements with private industry without being ladened by numerous Government regulations, such as the Federal Acquisition Regulations (FAR), or its Department of Defense supplement, the Defense Federal Acquisition Regulations Supplement (DFARS). The issue discussed during the research was whether a CRDA was a useful method to both expand the body of knowledge learned at Government laboratories to private industry and bring much needed funds to Government facilities and staff. The result of the study was an overall favorable opinion in the use of the CRDA, and a recommendation to expand future use of CRDA's in the environment of budget declines for Government agencies.

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I. INTRODUCTION

A. BACKGROUND

The area of research for this thesis will be Cooperative Research and Development Agreements for the Naval Postgraduate School (NPGS), Monterey, California. There were new guidelines for the marketing of Government technology, specifically new technology with commercial application, set forth by the Technology Transfer Act of 1986. NPGS is in a position to develop additional funds for faculty as well as school facilities from private industry because of the 1986 Act. The intent of the Act is to aid private industry in the area of research and development where time and facilities are in great demand and the competitive nature of the 1990's marketplace dictate increased technology advances to maintain a share of the world-wide market. Where the Government owned and operated laboratories can aid private industry with research and development, industry can provide funds to Government laboratories and universities to study and develop ideas which have commercial application.

B. OBJECTIVES

1. The first objective is to write and submit a CRDA to the Office of Naval Research (ONR) on behalf of the Naval Postgraduate School.
2. Learn from other Federal laboratories who have approved CRDA's in place what difficulties and opportunities they experienced.

3. Research the inventors/researchers who are doing the actual Research and Development for private industry to find benefits and detriments to using a CRDA.
4. Formulate recommendations concerning the Agreement, specifically is the CRDA a positive device, and does it accomplish the goals as set forth in the Technology Transfer Act of 1986.

C. RESEARCH QUESTIONS

1. Primary Research Question

How can the Cooperative Research Development Agreement (CRDA) aid Government laboratories and personnel to continue present levels of research in a shrinking budget environment?

2. Secondary Research Questions

- a. What is a Cooperative Research Development Agreement (CRDA)?
- b. What impediments must be overcome to successfully implement a CRDA?
- c. What benefits could be gained through the use of CRDA's?
- d. What are the essential elements that must be negotiated into an effective CRDA?

D. SCOPE LIMITATIONS AND ASSUMPTIONS

1. Scope

This thesis will revolve around the actual formation of a Cooperative Research and Development Agreement (CRDA) for Professor Steven L. Garrett, PhD., a Physics professor at the Naval Postgraduate School and the Research Administration Department. Impediments and benefits will be determined from the experience gained by developing a CRDA and through interviews with various other commands who have previously written such agreements. The process will include a critique of the

written agreement by ONR who is the authorizing command for CRDA's submitted by Navy activities.

2. Limitations

The body of knowledge with regard to writing and implementing CRDA's is limited due to the recent introduction of the legislation (the Technology Transfer Act of 1986) and Executive Order (Facilitating Access to Science and Technology, Executive Order 12591 dated April 10, 1987). There are few approved CRDA's available to study, analyze and evaluate. There are even fewer knowledgeable personnel in the Navy to interview on the subject. Much of the information used to complete this research was learned by actually writing and implementing a CRDA at the Naval Postgraduate School (NPGS).

3. Assumptions

The assumptions relied upon in this thesis refer to the "level of knowledge" the reader of this thesis or the reader of the enclosed CRDA Writer's Guide Appendix must possess. The reader will need to have a basic knowledge of contracting in the Defense Department to understand the significance of this document. A reader not familiar with the Federal Acquisition Regulation (FAR) would not see the advantages of the CRDA, which is exempt from the rules published in the FAR. All other aspects of the thesis, including the laws and Executive Orders establishing CRDA's will be explained in sufficient detail for the reader. The

enclosed CRDA Writing Guide is included to assist personnel without experience in contracting to write and negotiate a CRDA for their command/laboratory.

E. LITERATURE REVIEW AND METHODOLOGY

The bulk of the literature used in the thesis takes the form of Government pamphlets or reports, for example; Diffusing Innovations, Implementing the Technology Transfer Act of 1986, a report generated by the United States General Accounting Office (GAO) published in May 1991. When conducting the standard literature search using the Defense Logistics Studies Information Exchange (DLSIE) there was no listing under the topic title, or any other related topic except for "technology transfer" under the context of one Government contractor to another or technology from the United States to foreign countries.

The research methods used, under the restriction of little published documentation, was to search for approved CRDA's completed by other Government laboratories. There were three (3) commands selected with approved CRDA's in place to interview for the thesis. The goal was to learn how they accomplished their CRDA's, what impediments they overcame during the process and what benefits they derived from this process. The Office of Naval Research (ONR), the approving command for Navy CRDA's, also provided material to guide the process in the form of a draft guidance document to be used by commands undertaking this effort.

The final research method employed was to actually write and negotiate a CRDA for the Naval Postgraduate School. Participating in the effort proved to be a much more rewarding research method. There is no better way to learn about a subject, than actually rolling up your sleeves and doing it.

F. DEFINITIONS AND ABBREVIATIONS

1. Cooperative Research Development Agreement (CRDA) - means any agreement between one or more Federal laboratories and one or more non-Federal parties under which the Government, through its laboratories, provide personnel, services, facilities, equipment, or other resources with or without reimbursement (but not funds to non-Federal parties) and the non-Federal parties provide funds, personnel, services, facilities, equipment, or other resources toward the conduct of specified research or development efforts which are consistent with the missions of the laboratory; except that such term does not include a procurement contract or cooperative agreement as those terms are used in sections 6303, 6304, and 6305 of title 31, United States Code.
2. ONR (Office of Naval Research) - the agency of the Navy responsible for authorizing the acceptance of a Cooperative Research Development Agreement by the laboratory director.
3. Laboratory - means a facility or group of facilities owned, leased, or otherwise used by a Federal agency, a substantial purpose of which is the performance of research, development, or engineering by employees of the Federal Government.
4. FAR - Federal Acquisition Regulation.
5. DFARS - Defense Federal Acquisition Regulation Supplement.
6. E.O. - Executive Order.
7. NPGS - Naval Postgraduate School, Monterey CA.

8. **FLC - Federal Laboratory Consortium for Technology Transfer**, an organization that promotes and facilitates the transfer of research and development from Federal laboratories into applications in the private and public sectors.
9. **GOGO - Government Owned/Government Operated**, referring to the laboratory owned and operated by the Federal Government.

G. ORGANIZATION OF THESIS

The thesis is organized into six (6) chapters followed by Appendices containing the NPGS CRDA, the Office of Naval Research Draft Guidance for Cooperative Research Development Agreements (CRDA's).

1. Chapter I INTRODUCTION

This chapter gives the basic background for the thesis and the methodology used in developing the work.

2. Chapter II BACKGROUND

This chapter discusses the recent history concerning the subject area and outlines the different legislative actions that formed the present guidance for a CRDA.

3. Chapter III IMPEDIMENTS TO IMPLEMENTATION OF A CRDA

The chapter basically introduces the possible problems in completing and implementing a CRDA. An example of one such impediment is the difficulty in interpretation of some of the laws covering this area.

4. Chapter IV BENEFITS TO CRDA's

If the CRDA can be successfully implemented this chapter discusses some of the positive aspects for both the inventor and the Federal laboratory.

5. Chapter V ESSENTIAL ELEMENTS OF CRDA

This chapter discusses the fundamental elements required in a generic CRDA, and the significance of each of these elements.

6. Chapter VI CONCLUSIONS AND RECOMMENDATIONS

The thesis concludes with a determination whether the benefits to a CRDA outweigh the impediments in implementing such an agreement. The recommendations section discusses the further actions that could be taken to broaden the use of CRDA's.

7. APPENDIX A: NPS COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENT (CRDA)

8. APPENDIX B: STATEMENT OF WORK

9. APPENDIX C: TEST AND VERIFICATION REQUIREMENTS FOR JSCH 8080 DESIGN STANDARDS

10. APPENDIX D: ONR DRAFT CRDA GUIDELINES

11. APPENDIX E: NWC-CHINA LAKE COOPERATIVE R&D AGREEMENT PROCEDURES

II. BACKGROUND

A. RECENT HISTORY OF TECHNOLOGY INNOVATION LEGISLATION

The following is a recent history of Technology Innovation Legislation prepared for The Federal Laboratory Consortium (FLC) by the West Publishing Company, St. Paul Minnesota. It is an overview of the type of discussion concerning Technology Transfer taking place during the past decade.

1. 1980 Acts

a. Stevenson-Wydler Technology Innovation Act of 1980 (Public Law 96-480)

Highlights of this Act include a focus on the dissemination of information from Federal Laboratories to private industry. It established the Center for the Utilization of Federal Technology and Offices of Research and Technology Application at major Federal laboratories.

b. Bayh-Dole Act of 1980 (Public Law 96-517)

This Act permitted universities and small businesses to obtain title to inventions developed with governmental support. It also allowed Government-owned, Government-operated (GOGO) laboratories to grant "exclusive" licenses to patents.

2. 1982 Acts

a. Small Business Innovation Development Act of 1982 (Public Law 97-219)

This required agencies of the Federal Government to provide special funds for small business Research and Development (R&D) connected to the agencies' mission.

3. 1984 Acts

a. Cooperative Research Act of 1984 (Public Law 98-462)

This Act lessened some of the antitrust concern for companies wanting to pool research resources and engage in joint "pre-competitive R&D.

b. Trademark Clarification Act of 1984 (Public Law 98-620)

This Act permitted the decisions on the awarding of licenses for patents to be made at the laboratory level in Government-Owned, Contractor-Operated (GOCO) facilities. It allowed contractors to receive patent royalties for use in R&D, awards, or for education. It also permitted private companies to obtain exclusive licenses and authorized laboratories run by universities and non-profit institutions to retain title to inventions within limitations.

4. 1986 Acts

a. Japanese Technical Literature Act of 1986 (Public Law 99-382)

This Act improved the ability for U.S. interests to obtain Japanese science and engineering literature.

b. Federal Technology Transfer Act of 1986 (Public Law 99-502)

The first thing this Act did was make technology transfer the responsibility of all Federal laboratory engineers and scientists. It mandated that technology transfer responsibility be considered in employee performance evaluations. A royalty sharing principle was established for federal inventors with a minimum percentage of 15%. A reward system for other innovators was also established. The Act created the charter for the Federal Laboratory Consortium for Technology Transfer, a group informally established years earlier to promote technology transfers in public organizations. A funding mechanism for this association was also established. Agencies were empowered to allow directors of GOGO laboratories authority to enter into cooperative R&D agreements and negotiate licensing agreements with streamlined headquarters review. Laboratories were also allowed to make advance agreements with large and small companies on title and license to inventions resulting from Cooperative R&D Agreements (CRDA's) with Government laboratories. Directors were authorized to negotiate licensing agreements for inventions made at their laboratories. The Act provided for exchanging GOGO laboratory personnel, services, and equipment with their research partners. It was made possible for GOGO laboratories to grant and waive rights to inventions and intellectual property. The last significant result of the Act made it possible for current and former Federal employees to

participate in commercial development, to the extent there is no conflict of interest.

5. 1987 Acts and Executive Orders

a. Malcom Baldrige National Quality Improvement Act of 1987 (Public Law 100-107)

This Act established categories and criteria for the Malcom Baldrige National Industry Award. The existence of this award brought attention to excellence in technology. By receiving this award, a private or public organization was recognized for promoting new technology.

b. Executive Orders 12591 and 12618 (1987): Facilitating Access to Science and Technology

These Executive Orders promoted the commercialization of science and technology. By issuing Executive Orders this branch of the Government demonstrated its interest in the advancement of technology innovation.

6. 1988 Acts

a. Omnibus Trade and Competitiveness Act of 1988 (Public Law 100-418)

This Act emphasized the need for public and private organizations to cooperate to ensure full use of all technology developed from R&D resources. Industrial Extension Services were established within states and an information clearinghouse on successful state and local technology programs. The Act changed the name of the National Bureau of Standards to the National Institute of Standards and Technology and broadened its technology transfer role.

b. National Institute of Standards and Technology Authorization Act for FY 1989 (Public Law 100-519)

This Act established a Technology Administration within the Department of Commerce. It also permitted monetary consideration for rights to intellectual property other than patents in CRDA's.

c. Water Resources Development Act of 1988 (Public Law 100-676)

This Act authorized the Army Corps of Engineers laboratories and research centers to enter into CRDA's.

7. 1989 Acts

a. National Competitiveness Technology Transfer Act of 1989 (Public Law 101-189)

This Act granted Government Owned/Contractor Operated (GOCO) Federal laboratories opportunities to enter into CRDA's and other activities with universities and private industry, under essentially the same manner as highlighted under the Federal Technology Transfer Act of 1986. It also allowed information and innovations, brought into, and created through cooperative agreements to be protected from disclosure.

b. Defense Authorization Act for FY 1991 (Public Law 101-510)

Model programs were established for national defense laboratories to demonstrate successful relationships between Federal Government, State and Local Governments and small businesses. The Act also provided for development and implementation of a National Defense Manufacturing Technology

Plan. This plan will outline the future path for technology innovation in the Department of Defense.

B. COOPERATIVE RESEARCH DEVELOPMENT AGREEMENTS (CRDA's)

The Cooperative Research Development Agreement is an agreement entered into by a Federal laboratory and a non-Federal party to develop or further research in an area consistent with the mission of the Federal laboratory. To be more specific concerning the mission of the Federal laboratory, the normal goal of a CRDA is to develop technology to be used by entities outside the Federal Government, with the emphasis on commercialization of Government inventions. Commercialization can mean the use of inventions or software in State or Local Government or by a non-profit organization. For the purpose of this thesis, commercialization means to develop Government inventions to be marketed by private industry in return for financial support to the Federal laboratory in developing the technology and royalties from the sale of products produced from the invention or technology. A non-Federal party as stated above could mean a State or Local Government, a private industry (both large and small business) or a non-profit organization. The Federal laboratory can provide personnel, in the form of engineers, scientists or lab technicians, as well as facilities, services, equipment, or any other resource consistent with the laboratory's mission to accomplish the goal of the agreement. The one specific item the Federal laboratory cannot provide is

funds. No Federal money is obligated by the activity for the advancement/development of the subject technology. The non-Federal party can provide all of the same elements as the Federal laboratory with one important addition. The non-Federal party can also provide funds to promote the maturation of the invention.

The brunt of the significant legislation dealing with CRDA's appears from two Acts entered into law, the first, the Stevenson-Wydler Technology Innovation Act of 1980 and the second, the Federal Technology Transfer Act of 1986. The second law is really an amendment to the 1980 Act but profoundly changes the scope of the original Act, focusing attention on the CRDA and the authority given to individual Federal laboratory Directors to enter into such agreements.

The Stevenson-Wydler Act formulated the basic premise of technology transfer from Government activities to private industry. The logic behind the law was the increased competition of the modern market place, and the importance of United States manufacturers to keep advancing in their technology to retain or increase their market share. The problem Congress saw developing was the increased cost in personnel, time, and facilities industry had to invest to advance their individual research and development programs. Industries can maintain a fair share of a particular market for some time without an aggressive R&D effort but without advancements in technology, competitors (specifically those

outside the United States) would overtake them technologically and eventually control the market. Congress saw a major opportunity in the Federal laboratories because of their capabilities to perform basic R&D. New advancements in technology could benefit private industry by improving product lines and making industry more competitive in the world market. Prior to this time, Federal laboratory efforts had been maintained under the exclusive control of the Federal Government. The Stevenson-Wydler Act fulfilled both the needs of the Federal laboratories by potentially providing an additional source of funds for further R&D efforts and assisted private industry by providing personnel and facilities dedicated to pure research with any resulting breakthrough in technology more accessible than ever before for commercial use.

The focus of the Federal Technology Transfer Act of 1986, was to expand the intention of the 1980 Stevenson-Wydler Act to make technology transfer the responsibility of Federal laboratories. For the purposes of this thesis Section 12 of this Act has the most significance, stating that the director of any Government-operated Federal laboratory may enter into a CRDA. The director of the laboratory, in the case of NPGS the Superintendent of the School, has the authority to approve CRDA's upon review by the Office of Naval Research (ONR). ONR is limited to a period not to exceed 30 days to complete the review of the purposed CRDA. The Act states that

the laboratory can accept funds and other assistance as outlined in the 1980 Act to develop technology having commercial applications, or other inventions of interest to non-Federal parties. The former application, if patented is subject to exclusive licensing by the agency (NPGS) and royalty agreements can result.

C. SUMMARY

To summarize, the legislation first instituted a greater concern for disseminating technology from Federal laboratories to non-Federal parties, and later decentralized authority to each Federal laboratory director to enter into agreements and provide incentives for inventors to develop technology with commercial applications. Chapter III will go on to discuss the impediments to implementing a CRDA at NPGS.

III. IMPEDIMENTS TO IMPLEMENTATION OF A CRDA

A. INTRODUCTION

The initial intent of a CRDA was to make new technology accessible to non-Federal parties without the need to use the Federal Acquisition Regulations (FAR). The Agreement was not subject to the FAR or DFARS because the Congress stated in the Stevenson-Wydler Technology Innovation Act of 1980:

Government antitrust, economic, trade, patent, procurement, regulatory, research and development, and tax policies have significant impacts upon industrial innovation and development of technology, but there is insufficient knowledge of their effects in particular sectors of the economy. [Ref. 1:Section (2), para (7)]

The legislation goes further by stating, "A Federal Agency may issue regulations on suitable procedures for implementing the provisions of this section..." (section in this quotation refers to the authority to enter into a CRDA granted by the Act). [Ref. 2:Section 12, para (c)] It does not mean, however, that there are no impediments to successfully implementing a CRDA. To identify the impediments to the implementation of CRDA's there were three (3) research methods employed. The first method employed was personal experience gained from the actual process of drafting a CRDA for NPGS. Impediments to implementation became clear when the process was slowed because of problems and required actions to resolve. The second technique used was to interview persons

who have written, or had participated in writing, CRDA's for such commands as the Naval Weapons Center-China Lake (NWC), and Naval Underwater Systems Command (NUSC). Both commands have approved CRDA's in place and assisted in identifying impediments to implementation of an Agreement. Lastly, an analysis of ONR's draft guidelines provided some insight to impediments to implementing a CRDA, specifically outlining the role of legal council and technical specialists in the process. In the following paragraphs, a number of elements will be discussed and analyzed which must be overcome before the agency director is authorized to sign, therefore implement, a CRDA.

B. INTERPRETATION OF THE ONR GUIDELINES

1. Discussion

The first issue is the difficulty in the interpretation of the draft guidelines supplied by ONR. The original laws (P.L. 96-480 and P.L. 99-502) enacted in 1980 and 1986 respectfully, were very detailed. They identified the terms the Congress wanted included in an original CRDA. Each agency was authorized to draw up their own guidelines to implement the requirements of the laws. Because the laws themselves were both complicated and generally quite specific, with respect to its requirements, the "draft" guidelines offered to the Navy Federal laboratories followed much of the wording in the Acts. In the specific case of the CRDA written on behalf of the NPGS, four (4) members of the Research Administration

Department, Professor Steven Garrett (the Principle Investigator) and this researcher, had some difficulty agreeing to the intent of certain articles required to be included in the CRDA. In the framework of a CRDA, an article is similar to a clause used in a Government contract. The specific topic of the article can not be ignored, for example leaving it out of the Agreement, similar again to a clause in a contract, therefore it must be addressed for the Agreement to remain valid.

2. Analysis of Ambiguous Articles

a. Non-Exclusive Licensing

Articles 6.2 and 6.3 of the enclosed CRDA (Appendix A) discuss the ownership rights of Subject Inventions developed by either the non-Federal party employees or the Federal laboratory employees. In the context of the two articles, the definition of the phrase non-exclusive license came under debate between the personnel involved in writing the CRDA for NPGS. As the article reads the non-Federal party has the freedom to practice the Subject Invention (the meaning of the phrase "practice the Subject Invention" is to use the technology at the party's discretion) without paying for the right if either the non-Federal party or the Federal laboratory personnel develop the new technology. The consequence of this is considered important for this would prohibit the Government from requiring royalties from the licensing of the Subject Invention. The

concept of royalties will be discussed in Chapter IV as one of the strongest incentives for Federal inventors to pursue a CRDA with a non-Federal party. The personnel at NPGS didn't understand the general nature of the statement until the article was compared to later articles. The following paragraphs relate to the above subject, and when described in conjunction, allow a clear interpretation of the Articles.

b. Exclusive Licensing

The confusion between the above Articles and Article 6.6.2, Exclusive License Terms, resulted in confusion of the wording of the CRDA, because personnel wanted to prevent the loss of potentially valuable technology. The ambiguity was clarified when Articles 6.2 and 6.3 were analyzed concurrently with Article 6.6.2 and the wording compared. The substantial difference in the Article discussing Exclusive Licensing is as follows;

...GEGS (a division of General Electric) shall have the option to acquire an exclusive license for the life of the resulting patents at reasonable royalty rates upon the execution of an exclusive license agreement containing the terms and conditions and substantially in a form acceptable to NPGS. [Ref. 5:p. 11]

The acquisition of an exclusive license bars any other non-Federal party from practicing the Subject Invention for the life of the patent, approximately seventeen (17) years. The Agreement maintains a non-exclusive irrevocable license for the Government to practice the technology even though the exclusive license of the partner prohibits all other non-Federal parties access to the technology.

C. CONFLICT OF INTEREST

1. Discussion

Before the CRDA was sent to ONR for their review, under the above context, the organization's legal council should evaluate and provide their advise on the propriety of the agreement. "The technical and legal staffs of both the Federal and the non-Federal partners should consider it their responsibility to ensure that the agreement fulfills these concepts." [Ref. 6:Encl 1, p. 2] Legal council must agree in principle to the contents of the CRDA for it will be their responsibility to defend the laboratory if a conflict of a judicial nature were to arise. It is a prudent organization that keeps their legal department abreast of situations dealing with complicated legislation. The legal department's primary concern normally focuses on their responsibility to ensure that NPGS complies with Section (3) (A) of the Federal Technology Transfer Act of 1986 in the area of conflict of interest. That section states:

(3)(A) Any agency using the authority given it under subsection (a) shall review employee standards of conduct for resolving potential conflicts of interest to make sure they adequately establish guidelines for situation likely to arise through the use of this authority, including but not limited to cases where present or former employees or their partners negotiate licenses or assignments of titles to inventions or negotiate cooperative research and development agreements with Federal agencies (including the agency with which the employee involved is or was formerly employed). [Ref. 2:Section 12, para (c)]

2. Procurement Integrity Act

The biggest potential conflict of interest situation that must be resolved concerns the requirements of the Procurement Integrity Act outlined in section 27 of the Office of Federal Procurement Policy Act as amended by section 814 of Public Law 101-189. The following excerpts from FAR Part 3.104 implement the Act and starts with the statutory prohibitions and restrictions.

The following conduct is prohibited:

a. Prohibited Conduct by Competing Contractors

During the conduct of any Federal agency procurement of property or services, no competing contractor or any officer, employee, representative, agent, or consultant of any competing contractor while knowingly -

1. Make, directly or indirectly, any offer or promise of future employment or business opportunity to, or engage, directly or indirectly, in any discussion of future employment or business opportunity with, any procurement official of such agency.
2. Offer, give, or promise to offer or give, directly or indirectly, any money, gratuity, or other thing of value to any procurement official of such agency; or
3. Solicit or obtain, directly or indirectly, from any officer or employee of such agency, prior to the award of a contract any proprietary or source selection information regarding such procurement.

b. Prohibited Conduct by Procurement Officials

During the conduct of any Federal agency procurement of property or services, no procurement official of such agency shall knowingly:

1. Solicit or accept, directly or indirectly, any promise of future employment or business opportunity from, or engage, directly or indirectly, in any discussion of future employment or business opportunity with, any officer, employee, representative, agent, or consultant of a competing contractor.
2. Ask for, demand, exact, solicit, seek, accept, receive, or agree to receive, directly or indirectly, any money, gratuity, or other thing of value from any officer, employee, representative, agent, or consultant of any competing contractor for such procurement; or
3. Disclose any proprietary or source selection information regarding such procurement directly or indirectly to any person other than a person authorized by the head of such agency or the contracting officer to receive such information.

c. Disclose to Unauthorized Persons

During the conduct of any Federal agency procurement of property or services, no person who is given authorized or unauthorized access to proprietary or source selection information regarding such procurement, shall knowingly disclose such information, directly or indirectly, to any person other than a person authorized by the head of such agency or the contracting officer to receive such information.

d. Restrictions Resulting from Procurement Activities of Government Officers or Employees who are or were Procurement Officials

No individual who, while serving as an officer or employee of the Government or member of the Armed Forces, was a procurement official with respect to a particular procurement may knowingly:

- (1) Participate in any manner, as an officer, employee, agent, or representative of a competing contractor,

in any negotiations leading to the award, modification, or extension of a contract for such procurement; or

(2) Participate personally and substantially on behalf of the competing contractor in the performance of such contract.

The most important definition to understand in the Act is that of the "Procurement Official." FAR 3.104-4(h)(1) defines the Procurement Official as:

Any civilian or military official or employee of an agency who has participated personally and substantially in any of the following activities for a particular procurement -

- 1) Drafting a specification or a statement of work for that procurement;
- 2) Review and approval of a specification or statement of work developed for that procurement;
- 3) Preparation or development of procurement or purchase requests for that procurement;
- 4) The preparation or issuance of a solicitation for that procurement;
- 5) Evaluation of bids or proposals for that procurement;
- 6) Selection of sources for that procurement;
- 7) Negotiations to establish the price or terms and conditions of a particular contract or contract modification; or
- 8) Review and approval of the award of a contract or contract modification.

FAR 3.104-6 outlines the restrictions on employment or business opportunity discussions between competing contractors and procurement officials.

- a. **Applicability to procurement officials.** During the conduct of a Federal agency procurement, subsection 27(b)(1) of the Act prohibits an individual who has

become a procurement official from knowingly, directly or indirectly, soliciting or accepting from or discussing with any officer, employee, representative, agent, or consultant of a competing contractor, future employment or business opportunity.

- b. **Applicability to competing contractors.** During the conduct of a Federal agency procurement, subsection 27(a)(1) of the Act prohibits a competing contractor from knowingly, directly or indirectly, offering or promising to, or discussing with, a procurement official any future business or employment opportunity. The prohibition does not apply to an initial contact for the sole purpose of determining whether an individual or other entity is able to engage in discussions concerning future employment or business opportunity either because the individual or entity has been recused or is not a procurement official.
- c. **Eligibility for recusal.** An individual or other entity who is a procurement official may be eligible for recusal if the individual or entity has not participated personally and substantially in-
 - 1) The evaluation of bids or proposals, the selection of sources, or the conduct of negotiation in connection with such solicitation or contract during the period beginning with the issuance of a procurement solicitation and ending with the award of a contract or cancellation of a procurement; or
 - 2) The evaluation of a proposed modification, or the conduct of negotiations during the period beginning with the negotiation of a modification of a contract and ending with an agreement to modify the contract or a decision not to modify the contract.
- d. **Recusal Proposal.** An eligible procurement official who wished to discuss future employment or business opportunities with a competing contractor during the conduct of a procurement shall submit to the Head of the Contracting Activity prior to initiating or engaging in such discussions, a written proposal of disqualification from further participation in the procurement which relates to that competing contractor.

3. Analysis

It is the responsibility of the legal council in accordance with ONR guidelines to ensure that the Agreement negotiated by NPS does not present a conflict of interest in accordance with the above reference cited from the Federal Technology Transfer Act of 1986 and the Procurement Integrity Act. The points that must be resolved are: a) Does the Procurement Integrity Act apply to CRDAs? b) If it did apply, who are the "Procurement Officials." c) Can Professors work for companies while on sabbatical and still negotiate and work under a CRDA with the same company?

a. Does the Procurement Integrity Act apply to CRDAs?

The Office of Naval Research appears to have already solved this question but it should be resolved within each subordinate activity and understood by any party who considers entering into a CRDA relationship. In considering any specific CRDA, ONR's intent is to allow cooperation between the two parties to a greater degree than would be allowed in a Government contract. The disclosure of anything less than "arms length" relationships between the non-Government body and the Federal laboratory seems acceptable, to the extent this researcher has been able to discover.

b. If the Procurement Integrity Act did apply to CRDAs, who are the "Procurement Officials"?

By the letter of the law a "Procurement Official" is any individual described as in Section C(2)(d) of this chapter, someone taking an active role in any number of

processes associated with the contracting effort. This would indicate the Principle Investigator is a Procurement Official, and in a standard contracting activity would have many more restrictions placed upon them. In the CRDA, however, it is apparent the Act does not apply, for it implies a cooperative effort between parties (buyer and seller).

- c. Can Professors work for companies while on sabbatical and still negotiate and work under a CRDA with the same company?

The potential conflict experienced during the writing of the NPGS CRDA involved the project's Principle Investigator, Professor Steven Garrett. Professor Garrett has a working relationship as a consultant to the non-Federal party when on sabbatical (off quarters) from the NPGS. The CRDA establishes Professor Garrett as the Principle Investigator who controls the entire NPGS effort. This effort is expected to continue for approximately three years, during this timeframe, Professor Garrett is expected to work for the Government on alternate quarters and the CRDA contractor during the other quarters. The conclusion arrived at in writing the NPGS CRDA was the relationship between the Principle Investigator and the non-Federal party must remain at arms length when being compensated by the Government in his position at NPGS. If a conflict is identified prior to an agreement being authorized by the laboratory director, then the relationship between the Federal employee and the non-Federal party can possibly be terminated unless the conflict

can be resolved to allow the CRDA to be approved. If a solution to a potential conflict of interest cannot be resolved within the agency's current statutory framework, the Act allows the agency to propose any necessary statutory changes to be forwarded to its authorizing committees in Congress. [Ref. 2:Section 12, para (c)3(B)]

D. INEXPERIENCE OF NPS STAFF

1. Discussion

General inexperience in the process will cause considerable delay in having the CRDA written expeditiously. The NPGS staff had no experience writing a CRDA prior to the undertaking of this thesis. The process to undertake writing a CRDA first involved gathering the pertinent reference material for the Agreement. The guidance from ONR was obtained but required numerous man-hours of study for the Principle Investigator Professor Garrett, Professor G. Howard and this researcher before a competent ability was gained. A specific example of this inexperience was evident when Professor Howard and this researcher were discussing the concept of exclusive and non-exclusive licensing, and how this concept would affect the NPGS CRDA. Professor Howard was concerned that the interests of NPGS would not be protected in a non-exclusive license reserved for the non-Federal party. The conflict was resolved through analyzing the ONR guidelines and the context in which the terms were used. The non-exclusive license was not intended to protect the Government's

interests, for in a CRDA the technology is practiced without reservation. The authority of the Government to provide the non-Federal party "exclusive" rights to the technology, therefore preventing other non-Federal parties from practicing the technology, was the overriding strength of the Federal laboratory. Several examples of CRDA's from other commands were also obtained and compared. Discrepancies (in the context of wording) as well as similarities were noted by this researcher and compared with the ONR guidelines. The document was then drafted and critiqued by principle members of the Research Administration Department and the Principle Investigator. The time required for the above effort was in excess of three months until a final draft was reviewed by NPGS.

2. Analysis

The inexperience by personnel at the NPGS was not crippling to the process of writing the CRDA, it simply extended the process. As in any learning process the information must first be digested, compared with previous knowledge and experience, and finally tailored for local use. The experience was not monumentally difficult, but represented a natural learning process that required time.

E. WRITING THE STATEMENT OF WORK (SOW)

It was this lack of experience that caused months of delay in negotiating a statement of work. This could be considered

a problem, but as stated above when working with new information, it is better to define the process as assimilation. The effort was not directed toward a unified goal, all of the principal parties were occupied concurrently with their normal duties, no one person was tracking the process of producing the CRDA on a full time basis. The experience gained from writing the first CRDA does constitute a leap forward in the body of knowledge of the institution, therefore making future undertakings an easier task.

The SOW is a central part of the CRDA, to be written in coordination with the non-Federal party. The elements of the SOW are similar in practice to a standard contract written by any Government organization. Both parties are striving for a common understanding on the product being developed or the research being conducted. As stated in other portions of this thesis, a "meeting of the minds" must occur before a productive document is produced. The forum in which the SOW is produced is a negotiated conference by one of more representatives from each group, Federal laboratory and non-Federal party. More of the elements to be negotiated will be discussed in Chapter V. The practice relies on the cooperation of both parties to produce a SOW that each organization will find acceptable.

F. SUMMARY

In summary, the process of writing a CRDA takes timely deliberation by the drafter and reviewers to produce a satis-

factory document. The legislation and the ONR guidelines were written by legal personnel and are not readily understood by laboratories attempting to implement the current policy. Four major areas were identified that were impediments encountered while trying to complete the first CRDA at NPGS. The next chapter will discuss the benefits of a CRDA for both the non-Federal party and the Federal laboratory.

IV. BENEFITS TO CRDA'S

A. DISCUSSION

The result of writing and performing a successful CRDA is to transfer technology from a Federal laboratory to a non-Federal party. There are other means to accomplish this type of technology development. The non-Federal party could develop the technology "in house", therefore retaining funds within the organization. The legislation enacted in 1980 and 1986 was written with two basic purposes in mind. The first goal was to make the technology developed in Federal laboratories available to non-Federal parties.

The second purpose was to provide incentives for Federal laboratories to make the results of their research efforts available to these parties. The following paragraphs will discuss the above topics as well as other benefits of obtaining an approved CRDA to fund Federal laboratory research and development.

B. BENEFITS TO NON-FEDERAL PARTY

The legislation originating the Agreement was derived for the purpose of aiding American business to compete in the world market. "Technology and industrial innovation offer an improved standard of living, increased public and private sector productivity, creation of new industries and employment

opportunities, improved public services and enhanced competitiveness of United States products in world markets." [Ref. 1:Section 2, para (2)] The non-Federal party can be a substantial beneficiary in the relationship with the Federal laboratory.

1. The Use of Federal Laboratory Facilities

a. Discussion

The first specific benefit of a CRDA for a non-Federal party is the use of Federal laboratories to further research in common subject areas. The ideal scenario begins with similar technologies being explored in both a Federal and non-Federal laboratory. The parties may discover this fact in a number of different ways, typically through professional journals or by attendance at scientific meetings. Here is the first opportunity where the non-Federal party can benefit from the exchange with the Federal laboratory. Instead of exploring the technology with their possibly limited facilities and manpower, the non-Federal party will support the Federal laboratory to develop the technology. The Federal laboratory is specifically designed for research and development of new ideas, a perfect candidate for this activity. A non-Federal party will not have to divert assets into production, market development and R&D, instead the party could support the research by the Federal laboratory. The concentrated effort by the laboratory may bring quicker results, for the laboratory is not looking at marketing

opportunities, but is strictly interested in investigating new technology for Government purposes.

b. NPGS CRDA

In the case of the NPGS CRDA, the Physics Department represents a state of the art facility to develop new technology. The original concept for a "freon free" refrigeration system was developed by Professors Hofler and Garrett here at the NPGS, representing the best environment to continue the effort. The non-Federal party can use the advanced facilities at the school instead of investing funds to equip a similar laboratory. Professors Garrett and Hofler and their staff have the most experience and expertise in this technological area.

2. Commercial Applications of Technology

a. Discussion

The result of the partnership based on a CRDA is new technology that is adaptable to commercial use. The commercial use could be a product sold at a retail store, or possibly software marketed in the computer industry. The NPGS CRDA has the eventual goal of producing chlorofluorocarbon (CFC) - free refrigeration units. At present a prototype thermoacoustic refrigeration unit has been used on the NASA Space Shuttle, and was launched in January, 1992. This is simply the first step in the development of this new technology which appears to have an enormous commercial application. The units could be sold to other non-Federal

parties, or marketed to the general public. The commercial product will provide income for the non-Federal party, providing a range of benefits for the Federal laboratory as well as the personnel employed by the organization.

An added benefit to the product produced from this new technology is the potential market advantage to the non-Federal party. The new technology will likely produce a unique type of product with few if any, competitors. The potential market dominance for the non-Federal party is considerable. The eventual production of a commercial product will also provide a return to the investment of the non-Federal party. The funds provided to the Federal laboratory to develop this new technology will be returned in sales of any commercial products produced from the technology.

b. NPGS CRDA

Some of the potential applications from this new technology includes refrigerators for home use, air conditioners for automobiles and homes, and industrial refrigeration units of the type that cool large office buildings. All of these units would use an inert gas as a heat pumping medium, thus eliminate the damaging environmental affects of using freon. The potential of this technology is truly environmentally significant. The elimination of CFC's in refrigeration could possibly restore the ozone layer surrounding the earth. Not enough could be said to relay the

significance of this technology. The market share for the non-Federal party could virtually be 100 percent.

C. BENEFITS TO FEDERAL LABORATORY

There are several types of agreements between Federal agencies and private parties providing similar support to the Federal laboratory. The CRDA is unique in many ways as outlined by the legislation passed in 1980 and 1986. The second concept of the new legislation as outlined in chapter II was to give Federal laboratories and their employees incentives to develop new technology with commercial applications. One of the purposes of the Stevenson-Wydler Technology Innovation Act of 1980 was stated as...encouraging the exchange of scientific and technical personnel among academia, industry, and Federal laboratories." [Ref. 1: Section 3, para (5)]

1. Funds Provided to Federal Laboratories From a CRDA

The CRDA is unique in comparison to other non-Federal funding mechanisms.

a. Funds for Personnel and Services

There are other types of agreements that Federal employees utilized to provide salary support. One type of agreement is a research contract where the Federal employee (i.e., a Professor at NPGS) researches a problem or procedure for a non-Federal party. In compensation for his/her efforts, the Professor is provided salary support from the non-Federal party. This is a percentage of his salary contracted by the

University. An example given by one Mathematics Professor, Dr. Donald Barr, was that he worked at the school 50% of his time, or two (2) quarters, and was allowed to do outside research for the remaining year. In his contract for the University the non-Federal party was obligated to support 50% of the professor's salary.

In a CRDA there are funds provided for additional personnel to be employed at the Federal laboratory for the strict purpose of research on the Subject Invention. This personnel are not subject to the Government hiring freezes or restricted to members of the Civil Service. The additional staff provide support to the employees from the laboratory, to the PI in particular and the effort as a whole providing the strength in specific fields to accomplish the objectives of the CRDA. This benefit of a CRDA when seen from the surface looks routine, but when investigated, adds a great deal of depth to the research effort. In the NPGS CRDA the non-Federal party is providing three (3) full time employees to include a physicist, an engineer and an administrative assistant. The addition of these personnel will allow the Principle Investigator to complete a scheduled level of effort for a specific period of time. If the personnel had not been supplied by the non-Federal party, the effort to advance the technology would have slowed because of Government hiring practices and routine commitments of lab personnel in a school

environment (safety inspections, hazardous material inventory and other collateral duties).

b. Funds Provided from Royalties

One of the unique concepts of a CRDA relates to the funds directly available to Federal employees and laboratories for their efforts in advancing technology and transferring this technology to a non-Federal party. There is a process the CRDA provides to obtain these types of funds; royalties and licensing. Licensing of patent rights is not unique to a CRDA and will not be discussed. Royalties do provide a unique way to reward an inventor for his/her efforts in advancing a technology with commercial applications. A royalty is a percentage of the selling price of a commercial product provided to the Federal laboratory. The royalties are distributed to the Federal laboratory and the subject inventor up to the limits specified as a percent of the lab budget. The inventor is provided with not less than 15 percent of the royalties limited to \$100,000 in additional income for a given year [Ref. 2:Section 14, para (A) (i)]. This is income received over and above the salary obtained from employment from the Federal laboratory. The remaining 85 percent of the royalty may also provide an incentive to the inventor to advance other technology with commercial application as well as remain in the employ of the Federal Government.

As stated above the Federal laboratory is also provided with funds generated from the royalties of the commercial product.

The balance of the royalties or other income shall be transferred by the agency to its Government-operated laboratories, with the majority share of the royalties or other income from any invention going to the laboratory where the invention occurred; and the funds so transferred to any such laboratory may be used or obligated by that laboratory during the fiscal year in which they are received or during the succeeding fiscal year;

- (i) for payment of expenses incidental to the administration and licensing of inventions by that laboratory or by the agency with respect to inventions which occurred at that laboratory, including the fees or other costs for the services of other agencies, persons, or organizations for invention management and licensing services;
- (ii) to reward scientific, engineering, and technical employees of the laboratory;
- (iii) to further scientific exchange among the Government-operated laboratories of the agency; or
- (iv) for education and training of employees consistent with the research and development mission and objectives of the agency, and for other activities that increase the licensing potential for transfer of the technology of the Government-operated laboratories of the agency. [Ref. 2:Section 14, para (B)]

The benefits to the laboratories (Government owned and operated laboratories) can be significant, depending on the level of commercialization by the new technology developed at the laboratory. The funds generated by the royalties of the Subject Invention do not take the place of appropriated funds. The royalty purpose is to improve the environment for technology development.

D. BENEFITS TO TECHNOLOGY ADVANCEMENT

1. Discussion

The primary benefit derived from a CRDA is that it provides funds for the promotion of the subject invention. The funds are not simply in salary support to personnel, but additional equipment and technical services required to further the research. Unrelated to the issue of funds provided to the Federal laboratory is the issue of invention ownership. Although the Federal Government has the right to claim any and all inventions developed while an employee is within the Government's employ, the Technology Transfer Act of 1986 shifts the responsibility and authority to transfer technology to the laboratory. The laboratory personnel, although not the lawful owners of any invention, accept the role as "agent" for the technology therefore providing an incentive for the inventors to locate interested non-Federal parties to support the commercialization of the laboratory invention.

2. NPGS CRDA

The funds and other support provided by the non-Federal party will aid the NPGS to generally develop additional new technology during the performance of the CRDA. As seen in many NASA experiments, subsidiary inventions are not uncommon during related research and development. The CRDA requires any subsidiary inventions be under Government ownership consistent with the Subject Invention. The

additional funding simply provides an opportunity for the experimentation and possible development of other technology.

E. BENEFITS OF COMMERCIAL TECHNOLOGY

1. Discussion

The most unique characteristic of the CRDA is the goal of producing a commercial product from the subject technology. A product having commercial applications can be provided to the non-Federal party for them to pursue. In the CRDA, both parties are granted non-exclusive rights to explore any commercial invention developed during the duration of the CRDA. The Federal laboratory, additionally, has the authority to grant the non-Federal party an exclusive right to exercise the subject technology with monetary compensation advanced to the laboratory. The ability to license technology to promote the commercial application benefits more than simply the non-Federal party or the Federal laboratory. The advancement is a general improvement in the competitiveness of the U.S. industry. The CRDA provides another avenue to develop and market new technology, another dimension, to industry. The legislation first proposed in 1980 was adequately written to this end.

2. NPGS CRDA

The advantage of the CRDA for the NPGS is the enormous potential for a dominant commercial product to introduce into the market. The NPGS will have the authority to negotiate the

agreement, to include the exclusive license when a patent on a commercial product is developed.

F. SUMMARY

The CRDA was conceived by Congress to provide private industry another pool of research to keep them competitive in the world market. The Federal laboratories were available for this purpose, because until then little technology developed by Federal agencies made it to the open market. Until the CRDA the laboratories had few avenues to explore to enter their innovations into the public sector. Because the military was so often involved in sponsoring the work on new technologies, much of this work was controlled, restricted, from the public sector. The CRDA provided a means to transfer this technology while providing incentives to both the inventors and their laboratories to embrace this change. The most unique incentive is to provide monetary compensation for direct efforts of inventors and laboratories. Inventors could see significant salary increases over and above their normal salaries to participate in this effort. The CRDA represents a significant change in the Government to commit to the transfer of technology and to provide incentives for their many facilities to provide technology with commercial as well as private applications.

Chapter V will discuss and analyze the essential elements that must be considered when negotiating a CRDA.

V. ESSENTIAL ELEMENTS OF AN EFFECTIVE CRDA

A. INTRODUCTION

Negotiations are an integral part of any relationship between two parties attempting to reach an agreement, including a CRDA. Two groups can seldom agree on every aspect of a complicated issue, and negotiations provides a forum to discuss and resolve these differences. The following paragraphs will describe the essential elements included in a CRDA. The CRDA will be compared and then contrasted with a standard contract. Later in the chapter the specific negotiated elements of a CRDA will be discussed, with a summary to tie all of the above topics together. The method used to identify the essential elements of a CRDA was a thorough research of all pertinent legislation, such as the Stevenson-Wydler Technology Innovation Act of 1980 and the Federal Technology Transfer Act of 1986. The other literature analyzed was the ONR Guidelines for Cooperative Research Development Agreements (CRDA's) and the GAO Report Diffusing Innovations, Implementing the Technology Transfer Act of 1986. The above material was then compared with sample CRDA's obtained from Naval Weapons Center China Lake and Naval Undersea Systems Command. Common elements were included in the NPGS CRDA, while elements not common to all literature

were examined, again using the ONR Guidelines as the definitive source, and included if the element was considered applicable to the NPGS CRDA.

B. DIFFERENCE BETWEEN A CRDA AND CONTRACT

1. Applications of the Regulations

There are many similarities between a CRDA and a standard procurement contract used in the Navy. The true sense of the document, as previously stated, was to reach a meeting of the minds. The buyer (non-Federal party) and the seller (Federal laboratory) must reach an agreement, or there is no contract. In negotiated contracts this might be called an impasse, in a CRDA the parties simply walk away from the table, no specific term is described. The basic difference between a standard Government contract and a CRDA is the application of the regulations the two documents fall under. A Government contract falls under the purview of the Federal Acquisition Regulation (FAR) while the CRDA, although similar in many ways to a Government contract, is regulated by the agency given authority (the subject of this thesis has NPGS as the authority) and by the Technology Transfer Act of 1986. [Ref. 2:para (c)]

2. Reliance on Competition

The second significant difference between a CRDA and standard Government contract is the reliance on competition. The standard Government contract is regulated by the Competition in Contracting Act of 1984 (CICA), and must

address the issue of competition in every contract. The FAR which implements CICA requires competition in contracting unless the contract meets one of the seven exceptions allowed by CICA, such as overwhelming urgency. A CRDA, in contrast, is under the regulations of Federal Legislation Title 31 of the U.S. Code and isn't required to comply with CICA [Ref. 6:p. 1]. The essential difference in the conduct of a standard Government contract and a CRDA is the role reversal of the Government personnel taking the position of the seller and the cooperative nature of the agreement. In a CRDA, the Federal agency is in the role of seller with a product or service to provide. This change in perspective would seem to remove the adversarial nature on the part of the Government who normally is attempting to receive the best price in "procuring" goods and services. Because the CRDA is not restricted to the terms of the FAR or CICA, many of the boundaries to a cooperative agreement are erased. The groups are incentivized to reach an Agreement that is mutually beneficial. This cooperative negotiation will be discussed further in a later paragraph.

C. SIMILARITIES BETWEEN A CRDA AND CONTRACT

Essentially a CRDA is a legal contract because it includes all the basic elements of a contract. There is a "meeting of the minds" in the agreement, there is an "offer and acceptance" by the two parties and there is compensation provided by one party for the effort of another. It is only where

noted above that a CRDA differs from a standard Government contract and the reader should note that the CRDA is a legal agreement between two or more parties and breach of the terms of the agreement by one party allows the other party the ability to receive damages.

D. THE STATEMENT OF WORK (SOW)

1. Discussion

The elements consistently negotiated prior to drafting a CRDA take place primarily in the SOW. The first of these is the scope of the work being performed by the supplier, in this case the Government laboratory. This will be defined in broad terms with subsequent narrowing of the topic to a deliverable product or service. The type of personnel needed to perform the agreement will also be discussed by the potential partners. In the NPGS CRDA, the group negotiated to work on the project was made up of both Federal laboratory personnel and non-Federal party employees. The issue of support is also discussed during the writing of the SOW. Support in this context alludes to monetary and service support for the personnel performing the CRDA. Monetary support from the non-Federal party in a CRDA begins with salary support for the personnel of the Federal laboratory, and includes funds to support technical services and equipment purchases required during the course of the Agreement. The last essential element is the time frame that the CRDA will be performed. Because this might ultimately be an Agreement to produce a

commercial product or involve research of a competitive nature, the issue of time can be quite important. A CRDA is unlike a procurement contract, not simply because a Federal laboratory is not required to utilize the FAR, but because the SOW is negotiated at all. In the standard purchasing scenario, the requesting activity attempts to write a concise SOW, one with all of the requirements stated clearly in the document. The SOW is then presented to the purchasing activity along with funding. The purchasing activity then advertises the requirement per the SOW to any and all potential suppliers. Each potential supplier then has to translate the SOW into actual goods or services, which can be difficult in cases where the SOW has poorly defined requirements. The purchase can become unduly complicated if the SOW is vague or ambiguous, not clearly stating the requirements. The purchasing branch, if able, should attempt to assist the requiring activity in preparing the SOW, to give it basic understandable objectives. The purchasing branch will be limited in its technical ability, depending on the nature of the buy, but if experienced in the field it can translate complicated requirements into definitive specifications.

Once the solicitation is published in a public forum, the suppliers must translate the requirement into language they can understand. The advantage of a SOW submitted with a CRDA is the supplier and the buyer, as outlined above, work

together to produce the document. This is where the negotiation starts in a CRDA.

a. Element (1) - Description of Technology

Before any other elements are discussed, the two parties sit down to discuss what the non-Federal party wants and what the Federal laboratory has the capacity to provide. The non-Federal party will normally know something of the technology being deliberated, which is why they have gotten together with the particular Federal laboratory. It is not uncommon in many instances that the non-Federal party has done some research in the same area. It is in determining what additional assistance the Federal laboratory can provide that must be defined. Common to many negotiations, the parties spend some period of time on this area alone. If it is determined the laboratory does not have the capability or willingness to develop what the non-Federal party wishes the project will end at this point.

b. Element (2) - Time Period

Assuming the first element is successfully negotiated, and the Federal laboratory is agreeable and able to develop the required technology, the "nuts and bolts" of the negotiations can undertaken. The Agreement will not be discussed further if the two parties cannot first: 1) decide what it is they want or 2) the laboratory is not able to provide the required expertise. An essential element included

in the SOW is the time period to complete the stated objective. Because the goal of a CRDA is normally to advance a certain technology and to produce a future commercial product, time is of great concern. In a competitive market, other parties are attempting to develop like technology and the party with the first commercial application is more likely to achieve market domination.

c. Element (3) - Compensation

The next element that must be considered in the SOW is the compensation for the efforts of the laboratory. It should be noted that the compensation involved in the CRDA is included as part of the SOW. Primarily, the initial funds provided will be salary support for laboratory personnel working on the project. The CRDA is not unique in this characteristic, many Professors and other Government personnel support their salaries with resources from external parties by doing their requested research. It is written into the CRDA that the non-Federal party will support the laboratory's efforts by providing funds to purchase the needed technical and material support for the laboratory. It requires a large sum of money to develop technology from the research stage to a commercial product.

2. NPGS CRDA

The negotiation of the compensation is essential because the parties must agree on the required support to accomplish the CRDA. In the CRDA written for NPGS, the effort

is estimated to cost approximately \$550 K, which translates to salary support for the three (3) Federal laboratory employees, technical service support and equipment requirements for a period of approximately 33 months. Support normally includes equipment specific to the type of technology being advanced to conduct research and produce prototypes. A CRDA is unique in reference to the compensation included because the Federal laboratory, like a seller, is allowed to supply personnel and facility support, but no monetary compensation can be transferred to the non-Federal party for any of the activities.

a. Manpower Requirements

In the next two sections the funding support for NPGS personnel working on the project is outlined as well as the additional support from personnel provided by the non-Federal party. The non-Federal party not only provides funds for the agreement, but could provide personnel as well. The NFGS CRDA was negotiated to include three (3) additional personnel employed by the non-Federal party but under direct control of the project's Principle Investigator (PI). This exemplifies the level of support the CRDA can provide for the developing technology. The following sections outline what type of personnel are required by each of the parties. This is similar to the labor categories listed in a procurement contract. This is negotiated as well, for the non-Federal party will be concerned about skill levels required for

specific portions of the research. In the case of the NPGS CRDA, the employees provided by the non-Federal party were engaged specifically for the effort at the school. In this manner, the correct classification of employee can be provided without depleting the non-Federal parties workforce. In addition, this process demonstrates the level of commitment the non-Federal party invests in the project. In this particular CRDA, the employee support is the most significant support provided by the outside party, because NPGS facilities in this area of research are quite advanced in relation to other similar laboratories. Additionally, personnel may have to be hired to assist the laboratory in the research. The advantage of monetary support to the non-Federal party is the savings of time and facility development in the technology area.

The concept of technology transfer first legislated in 1980 was to assist private industry in the competitive market by providing additional research facilities, such as Government laboratories, to aid industry with a valuable research capability. The Federal laboratory may have many capabilities, while lacking in personnel to facilitate new research. By providing additional personnel, the non-Federal party is reducing the stress on the laboratory therefore increasing the effort to advance the technology. The non-Federal party involved in the NPGS CRDA provided three (3) additional personnel with skills in physics, technical

expertise and administrative skills essential to the R&D effort. Additional manpower afforded by the CRDA provides the balance of personnel for the equipment available, the tasks at hand and the time frame of the CRDA.

b. NPGS Funding Requirement

Funding Requirements for the NPGS are included in the SOW, rather than the body of the CRDA because the essential negotiated elements can be discussed in the SOW while the original CRDA remains constant. This allows for modification of the Agreement without great difficulty. The effort for the NPGS CRDA is divided into two separate phases, with separate funding requirements. The salaries for the additional manpower discussed above is provided by the non-Federal party and is not included in the funds requirement portion of the SOW, this is additional support negotiated during the formulation of the SOW but not included in the monetary sum provided in the Agreement. Both Phase one (1) and Phase two (2) of the CRDA are provided funding for NPGS staff salaries including overhead, materials, contracted services and travel for NPGS staff. The phases are separated because without success in the first phase, the second phase will not be performed. The funding does not include the use of laboratory facilities or operations overhead. As stated in legislation, the laboratory provides these services as their contribution to the CRDA R&D effort.

E. RIGHTS TO MATERIAL

1. Discussion

An interesting paragraph in the CRDA is listed as Deliverables. This section identifies what the Federal laboratory would deliver to the non-Federal party. It is here where the level of effort is discussed. This agreement is similar to a Cost Reimbursable Type contract in that it is undertaken with the assumption the laboratory will perform a stated level of effort, and may not produce anything but data, more specifically, the desired technology of the Agreement may not be realized.

The effort of the laboratory is designed to produce advances, which could lead to a commercial product to be marketed by the non-Federal party. If the Federal laboratory is unable to complete the performance criteria, the Agreement will essentially end. The parties will then discontinue the CRDA.

The product produced in accordance with the CRDA are normally delivered to the non-Federal party similarly to any procurement contract. The ownership of the technology leading to the production of the material is unique in this type of Agreement. The non-Federal party is often involved in a R&D effort in the same technology as the Federal laboratory. During the performance of the CRDA, the non-Federal party is still allowed to continue any research effort they wish in the subject area. The ownership of the material produced at the

Federal site will belong to the Federal laboratory, with the Non-Exclusive right to practice the technology reserved for the non-Federal party. The Government is also allowed to practice any involvement it wishes in the subject technology. Unique to a CRDA is the joint invention of new technology, and the subsequent ownership of this material. As stated in Article 6.3 of the NPGS CRDA, any invention made jointly between one or more non-Federal party employees and one or more NPGS employees has ownership rights reserved for the Government.

2. NPGS CRDA

The non-Federal party is still allowed to practice this technology under non-exclusive rights. This element of a CRDA is essential because it outlines the nature of the relationship between the two parties subsequent to performance of the CRDA. The protection the non-Federal party receives only applies if the non-Federal party licenses the "exclusive" rights to the Subject Invention. The Government has always reserved the right to use the Subject Invention because it does not pose any threat in the market place. In the NPGS CRDA, the Government will have the right to produce its own non-CFC acoustic refrigeration units without consent of the non-Federal party. The Agreement only prohibits the use of the Subject Invention by other non-Federal parties if the partner in the CRDA licenses the exclusive rights to the Invention.

F. SUMMARY

This chapter discussed the essential elements to a CRDA. The CRDA was intended to be a simple document providing incentives to both Federal laboratories and non-Federal parties to cooperate to produce advanced technology and new commercial products. The following chapter presents the conclusions and recommendation of the thesis. The research question will be answered and areas for further research introduced.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

The following conclusions were arrived at as a result of this study. They are divided into two sections. Section 1: CRDA provided incentives for non-Federal parties to support of Federal laboratories as part of their research effort; and Section 2: Incentives to Federal laboratories to continue efforts to develop technology with commercial applications.

1. The CRDA Provided Incentives for Non-Federal Parties to Support the Federal Laboratories in their Research Effort

The non-Federal party was the original concern of the Congress in 1980 when the first CRDA legislation was passed. In 1980, the military was growing, and because of this general escalation in Government spending, the budgets for Federal laboratories were increasing. No one could foresee the results of the last two years and what "peace" has done to the DOD budgets. The CRDA has adapted to improve the opportunity for industry to have access to Federal laboratory technology while providing additional support for Federal agencies' personnel and facilities. The budget is scheduled to be severely cut in the next five (5) years and money to promote R&D will be likely candidates for these cuts. Industry is capable of providing funds for projects under development at Federal laboratories while marketing commercial products that

result from the R&D. Industry in the U.S. has faced severe competition from foreign suppliers while the American industrial base continues to erode. The injection of Federal laboratory technology, in the form of commercial product development can assist the American industrial base to remain competitive.

2. The Incentives, Provided by the CRDA, for Federal Laboratories can possibly aid their Efforts to Develop New Technology to benefit Non-Federal Parties by Contributing Additional Commercial Products

The argument proposed in the first section is echoed here in Section 2. The DOD budget is likely to shrink in the next several years, DOD budget is emphasized because the laboratory outlined in this thesis is a command of the Department of the Navy. The funds provided by CRDA's do not substitute for the appropriated funds in the DOD budget, but while the budget continues to shrink the funds supplied by a CRDA will continue to attract quality inventors and support the laboratory facilities. Suppose for instance the budget in a particular year will not support upgrading a Federal laboratory. The upgrade may still be possible if the funds are available from another source, such as royalties from a CRDA.

B. RECOMMENDATIONS

1. Promote Federal Laboratory Technology with Commercial Applications

Each Federal laboratory has a mission to accomplish. During the course of accomplishing this mission certain

technologies are developed that may present commercial application. It is recommended that the laboratory develop an efficient method to catalog technology with possible commercial application and make this information available in a public forum. An example of public notification is to publish a catalog notice periodically during the year in the Commerce Business Daily (CBD). Interested parties can contact the laboratory for further information or to obtain the catalog itself. In this manner the laboratory is not straying from its commissioned purpose, and still presenting the new technology to the public.

2. Increase the Notification and Education, by the Office of Naval Research, of Benefits in Utilizing CRDA's for all Navy Federal Laboratories

There are other agencies of the Federal Government who have been involved in CRDA's for a number of years. The Navy seems to be lagging in the process of promoting this method of transferring new technology. It is therefore recommended that ONR increase the knowledge of the use of CRDA's in the Naval Federal laboratories, while promoting the technology. This will uncover additional technology that may have commercial potential and provide needed funds to more Federal laboratories. There may be new innovations in the infancy stages at a Federal laboratory lacking the needed funds to complete development. If the laboratory were aware of the simplicity and funding benefits of the CRDA the idea may be put on the block for possible non-Federal partnership.

C. ANSWERS TO RESEARCH QUESTIONS

- 1. How can the Cooperative Research Development Agreement (CRDA) aid Government Laboratories and Personnel to Continue Present Levels of Research in a Shrinking Budget Environment?**

The answer to the primary research question was explained using the NPGS as an example of the possibilities of a CRDA. The CRDA written by the NPGS was submitted to ONR in the month of December 1991. The CRDA was in draft form and comments were requested to improve a final draft. ONR later stated that the draft would be accepted as an official submission and this document could have the potential of providing in excess of \$ 500,000 in direct support for NPGS personnel and project development funds. In addition the project dealt with a CFC-free refrigeration system, which if developed for commercial application for General Electric, could mean additional funds in licensing fees and royalties for NPGS and the Department of Energy (Los Alamos National Laboratory). As one can see the CRDA has the potential of providing both funds for the inventor of certain technologies and capital for the Federal laboratory that employs and supports the inventor. The funds provided by the CRDA for the Federal laboratory are considered to be excess of appropriated funds. A laboratory's appropriation will not be reduced because of a successful CRDA present at the laboratory. In the event the budget may be reduced because of a general reduction in Government spending, the Federal laboratory may

be able to continue their present workloads with funds provided through CRDA royalties.

2. What is a Cooperative Research Development Agreement (CRDA)?

As discussed in the Introduction and Background chapters, the CRDA is an Agreement that develops and shares Federal laboratory technology which may have commercial applications with a non-Federal party. The development of the technology is supported by both partners, with the non-Federal party also providing funds to support the effort. The Federal laboratory also receives funds in the form of royalties from the sale of the commercial product developed from the laboratory technology.

3. What Impediments must be Overcome to Successfully Implement a CRDA?

There were four categories of impediments to implementing a successful CRDA discussed in Chapter III. The first discussed during the thesis was the difficulty in interpreting the regulations from legislation passed in 1980 and 1986 by Congress. Because the legislation was so specific, the regulations drafted by the separate agencies is also very complicated. It took some effort to analyze the requirements of ONR for the CRDA written by the NPGS. This effort leads to the second impediment encountered during the drafting of the CRDA. Because of the general lack of experience by all individuals participating in the drafting the CRDA, the process took additional analysis at each step,

therefore lengthening the time to complete the draft CRDA for submission to ONR. The last impediment in implementing the CRDA was the writing of the SOW. Because the SOW is the heart of the CRDA, where all detailed information is outlined for the cooperative effort, it again takes additional effort by the inventor before negotiating the Agreement. All of the above impediments were not difficult but took concerted effort to analyze and act upon. Cooperation within the organization is key to discuss problems and plan corrective action.

4. What Benefits could be Gained Through the Use of CRDA's?

As discussed in Chapter IV and in the conclusions section of this chapter, the main benefits of a CRDA are the advancements in technology available to private industry while providing Federal laboratories and their inventors monetary support to develop research and provide personnel compensation. Since the latter 1980's, two events have been occurring simultaneously in the United States. The first of these is the decline of American industry in the world market. Competition is ever increasing in today's free markets and the industrial base in the United States needs to improve their performance in order to survive. One avenue that may help is to utilize the Government laboratories to help create new commercial products with advanced technology. The CRDA was first proposed for this reason, to help American industry compete by opening up the new technologies developed in Government laboratories. The second event is the decline of

Government budgets for many of its agencies. The CRDA can not only provide personal incentives for inventors by offering them compensation in excess of their present salaries, but the laboratories can benefit by sharing in royalties derived from the licensing of new technologies. The secondary, but also important benefit from using the CRDA vice another avenue to obtain services of a Federal laboratory is the exemption from many of the restrictive and time consuming Government regulations such as the FAR. In eliminating the use of the FAR, the parties are able to build an agreement based on cooperation, not requiring the maintenance of an "arms length" relationship. This also has the affect of streamlining the process of reaching an agreement and saves time in an arena based on current results. The above benefits not only explain the essence of the CRDA, but it also demonstrates the uniqueness of the Agreement.

5. What are the Essential Elements that must be Negotiated into an Effective CRDA?

The essential elements of a CRDA are the compensation for the effort by the Federal laboratory and the SOW as a whole. The main objective in the negotiation is to consider what the cost of the development will be and the time it will take to complete it. There is no profit motive to be discussed and the materials are simply added to the overall cost. This type of Agreement was compared to a Cost-type contract used in many Government research contracts. The essential element is the "level of effort" the inventor must

invest on the project. In contrast to a fixed-cost contract where there is a defined deliverable commodity, a Cost-type agreement does not require a definite product that must result from the effort. The SOW is essentially the only negotiated portion of the CRDA, with the SOW being negotiated in a cooperative forum. Both parties have similar goals during the negotiation process and this lends itself to a more collaborative effort. Additionally, the personnel and deliverables, as with any procurement are also considered essential. The personnel in this context deals with the numbers and types of support required to complete the desired effort in a timely manner. As discussed in Chapter V, the subject invention is destined for the competitive market and must arrive in a timely manner to control a share of the market. All of these elements are simple to negotiate if the parties agree, but are essential if the effort is to be successful.

D. SUGGESTIONS FOR FURTHER RESEARCH

An area that might bear further study is the relationship between the Principal Investigator and the non-Federal party. As stated in this thesis the PI does possess the requirements of a procurement official as defined in the Procurement Integrity Act. There represents a possible conflict of interest problem when the PI negotiates with the non-Federal party, a relationship already described as cooperative, and not "arms length." The potential conflict between the two

pieces of legislation could be a topic of some merit for another student of the Naval Postgraduate School, in regard to a CRDA.

APPENDIX A

NPS COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENT (CRDA)

03 June 1992

GENERAL ELECTRIC GOVERNMENT SERVICES

and

NAVAL POSTGRADUATE SCHOOL, MONTEREY CA

**AGREEMENT FOR
COOPERATIVE RESEARCH AND DEVELOPMENT**

This is a Cooperative Research and Development Agreement ("Agreement"), CRDA-91-NPS-001, as authorized and encouraged by the Federal Technology Transfer Act of 1986 (P.L. 99-502, October 20, 1986) and Executive Order 12591 (10 April 1987), and implemented by the DoD Domestic Technology Transfer Program Regulation, 3200.12-R-4 (27 December 1988). The parties to this AGREEMENT are General Electric Government Services (GEGS), a Corporation of the State of Delaware, and a large business firm, and the Naval Postgraduate School (NPS), an education and research facility of the United States Navy.

WITNESSETH THAT:

Whereas the Congress, in enacting the Federal Technology Transfer Act of 1986, has found that Federal laboratory developments should be made accessible to private industry, state and local Governments, and has declared that one of the purposes of that Act is to improve the economic, environmental and social well-being of the United States by stimulating the utilization of Federally funded technology developments by such parties; and

Whereas, the Federal Technology Transfer Act of 1986, among other technology transfer improvements, has provided each Federal agency with the authority to permit Government-operated Federal laboratories to enter into cooperative research and development agreements (CRDA's) with Federal or non-Federal entities, including private firms and organizations, for the purpose of providing to collaborating parties personnel, services, property, facilities, equipment or other resources (except funds), or obtaining from collaborating parties personnel, services, property, facilities, equipment or other resources (including funds) toward the conduct of specified research and development efforts which may include the disposition of patent rights in any inventions which may result from such collaboration; and

Whereas, GEGS has performed substantial research and development with respect to "space shuttle-based refrigeration" systems; and

Whereas, NPS has performed substantial analysis with respect to THERMOACOUSTIC REFRIGERATION technology and systems concepts (the "Technology"); and

Whereas, NPS possesses certain advanced scientific skills, facilities, special equipment, instrumentation, information, computer software, and know-how pertaining to the Technology; and

Whereas, NPS desires to pursue the development of the Technology with the purpose of further developing uses of such THERMOACOUSTIC REFRIGERATION systems; and

Whereas, NPS is interested in the utilization of this Technology by the private and public sectors; and

Whereas, GEGS desires to support NPS's further development of the Technology; and

Whereas, GEGS, upon the successful completion of development, desires to carry out a plan for marketing the Technology for a variety of commercial applications, such as material processing, storage of biological samples, and residential food refrigeration; and

Whereas, NPS views its collaboration with GEGS to develop the Technology and the commitment of GEGS to undertake its plan to be in the furtherance of the public interest;

THE PARTIES HERETOFORE AGREE AS FOLLOWS

Article 1. Definitions

As used in this AGREEMENT, the following terms shall have the following meanings and such meanings should be equally applicable to both the singular and plural forms of the terms defined:

1.1 "AGREEMENT" means this cooperative research and development agreement.

1.2 "THERMOACOUSTIC REFRIGERATION" means the use of sound to pump heat against a temperature gradient.

1.3 "Invention" means any invention or discovery which is or may be patentable under Title 35 of the United States Code.

1.4 "Made" in relation to any invention means the conception or first actual reduction to practice of such invention.

1.5 "Proprietary Information" means information which embodies trade secrets developed at private expense and outside of any Government contract or which is confidential business or financial information, provided that such information:

(i) is not known or available from other sources without obligations concerning its confidentiality;

(ii) has not been made available by the owners to others without obligation concerning its confidentiality;

(iii) is not available to the Government without obligation concerning its confidentiality.

1.6 "Subject Data" means all recorded information first produced in the performance of this AGREEMENT.

1.7 "Subject Invention" means any invention conceived or first actually reduced to practice in the performance of work under this AGREEMENT.

Article 2. Cooperative Research

2.1 Statement of Work. Cooperative research performed under this AGREEMENT shall be performed in accordance with the Statement of Work ("SOW") attached hereto. NPS agrees to perform the cooperative research and to utilize such personnel, resources, facilities, equipment, skills, know-how and information as it considers necessary, consistent with its own policies, missions and requirements. GEGS agrees to perform the cooperative research and to utilize such funds, personnel, resources, facilities, equipment, skills, know-how and information as it considers necessary.

2.2 Review of Work. Periodic conferences shall be held between NPS and GEGS personnel for the purpose of reviewing the progress of work. It is understood that the nature of this cooperative research is such that completion within the period of performance specified, or within available internal financial support, cannot be guaranteed. Accordingly, it is agreed that all cooperative research is to be performed on a best effort basis.

2.3 Principal Investigator. NPS agrees to assign a substantial portion pursuant to the SOW to Steven L. Garrett. The work will be performed under the supervision of Steven L. Garrett, who, as principal investigator, has the responsibility for the scientific and technical conduct of this project by NPS personnel.

2.4 Scope Change. If at any time NPS or GEGS determines that the research data dictates a substantial change in the direction of the work, the parties shall make a good faith effort to agree on any necessary change to the SOW. Prior to implementation, any scope changes or modifications shall be subject to review and approval of the Chief of Naval Research (CNR).

Article 3. Reports

3.1 Quarterly Reports. NPS shall submit quarterly written reports to GEGS during the term of this AGREEMENT on the progress of its work and the results being obtained and shall make available to GEGS to the extent reasonably requested, other project information in sufficient detail to explain the progress of the work.

3.2 Final Report. NPS shall submit a final report of its results to GEGS within THREE (3) months after completing the work called for in the SOW.

Article 4.1 Financial Obligation

NPS's performance under this AGREEMENT is conditioned on the advance payment by GEGS of any funds, and fund transfer between the parties is expected or anticipated under this AGREEMENT.

It is anticipated that a total of seven hundred seventeen thousand two hundred dollars (\$717,200) will be paid by GEGS to NPS. Payments will be made by GE purchase order G350075J70, and

that document is hereby made part of this agreement.

NPS will account for all funds in accordance with the Accounting System in use by NPS and will provide to GEGS summary expenditure reports.

The payments described above are to NPS. Any payments by GEGS to other parties in support of this or other work are in addition to these payments.

Article 4.2 Cost Limitation

GEGS has no financial obligation to NPS beyond the amounts described above and NPS has no obligation to perform work once the amounts transferred to NPS have been expended.

Article 5. Title of Property

5.1 Capital Equipment. All equipment and materials developed or acquired under this AGREEMENT with funds transferred to NPS shall be purchased by and become the property of NPS.

5.2 Disposal of Toxic or Other Waste. Each party shall be responsible for the removal of any toxic material used or generated at its own site in the course of performing this

AGREEMENT. Each party shall obtain at its own expense all necessary permits and licenses as required by local, state, and federal law and shall conduct such removal in a lawful and environmentally responsible manner.

Article 6. Patent Rights

6.1 Reporting. NPS shall promptly disclose to GEGS each Subject Invention reported to NPS by NPS employees. GEGS shall promptly disclose to NPS each Subject Invention reported to GEGS by any GEGS employees.

6.2 GEGS Employee Inventions. NPS, on behalf of the U. S. Government, waives any ownership rights the U.S. Government may have in Subject Inventions made by GEGS employees as a result of research performed under this agreement and agrees that GEGS shall have the option to retain title to any such Subject Invention. GEGS shall notify NPS promptly upon making this election. If this election is made, GEGS will file timely patent applications on such Subject Invention at its own expense. GEGS hereby grants to the U. S. Government a world-wide, nonexclusive, irrevocable, paid-up license to practice, or to have practiced on behalf of the U.S. Government solely for government purposes, the patents covering GEGS Subject Inventions. This patent license shall be evidenced by a confirmatory license agreement prepared by GEGS in a form satisfactory to NPS.

6.3 NPS Employee Inventions. NPS, on behalf of the U.S. Government shall have the initial option to retain or acquire title to each Subject Invention made by NPS employees and in each Subject Invention made jointly by one or more GEGS and one or more NPS employees. NPS shall notify GEGS promptly upon making this election and file timely patent applications on such Subject Inventions at its own expense. In the event that NPS informs GEGS that it elects to retain title to such joint Subject Invention, GEGS agrees to assign to the Government whatever right, title and interest GEGS has in and to such joint Subject Invention, subject to the retention by GEGS of a worldwide, nonexclusive, irrevocable, paid-up license to practice, or to have practiced on its behalf, the patents covering such joint inventions. NPS also agrees to grant to GEGS a worldwide, nonexclusive, irrevocable, paid-up license to practice, or to have practiced on its behalf, the patents covering NPS employee Subject Inventions. This patent license shall be evidenced by a confirmatory license agreement prepared by NPS in a form satisfactory to GEGS.

6.4 Filing of Patent Application. The party having the right to retain title and file patent applications on a specific Subject Invention may elect not to file patent applications thereon provided it so advises the other party within NINETY (90) days from the date it discloses the Subject Invention to the other party. Thereafter, the other party may elect to file patent

applications on such Subject Invention and the party initially reporting such Subject Invention agrees to assign its right, title and interest in such Subject Invention to the other party and cooperate with such party in the preparation and filing of patent applications thereon. The assignment of the entire right, title and interest to the other party pursuant to this paragraph shall be subject to retention by the party assigning title of a nonexclusive, irrevocable, paid-up license to practice, or have practiced on its behalf, the Subject Invention throughout the world. If neither party elects to file, ownership shall be left with the inventor(s), subject to each party retaining a nonexclusive, irrevocable, paid-up license to practice, or have practiced on its behalf, the Subject Invention throughout the world.

6.5 Patent Expenses. The expenses attendant to the filing of patent applications as specified in 6.4 above, shall be borne by the party filing the patent application. Each party shall provide the other party with copies of the patent applications it files on any Subject Invention along with the power to inspect and make copies of all documents retained in the official patent application files by the applicable patent office.

6.6 Licenses.

6.6.1 Grants. NPS, on behalf of the Government, hereby agrees to negotiate the granting to GEGS, on the terms set forth

in Article 6.6.2 below, an exclusive license, including the right to sublicense, in each U.S. patent application, and patents issued thereon, covering a Subject Invention which is filed by NPS on behalf of the U.S. Government subject to the reservation of an irrevocable, royalty-free license to practice, and to have practiced on behalf of the U.S. Government, solely for government purposes, the Subject Invention and such other terms and conditions as are specified by NPS in such license.

6.6.2 Exclusive License Terms. Upon filing by NPS of a U.S. patent application on a Subject Invention, GEGS shall have the option to acquire an exclusive license for the life of the resulting patents at reasonable royalty rates upon the execution of an exclusive license agreement containing the terms and conditions in a form acceptable to NPS. The specific royalty rate shall be negotiated promptly after the Subject Invention is filed in the U.S. Patent and Trademark Office, provided however, that this option must be exercised by GEGS by written notice to NPS within one (1) year from the date GEGS is informed of the filing. In determining such royalty rate, the parties shall consider the following guidance: The reasonable royalty rate for each exclusive license shall be based upon the portion of the selling price of the item attributable to the presence of claimed subject matter where such item is a machine, article of manufacture, product made by a process, or composition of matter as defined by the claims of the patent. Where the claimed

subject matter relates to a process or method to be practiced under the claims of the patent, the royalty will be based upon the net savings attributable to the implementation of said process or method. Royalties will not be owed on items sold to agencies of the Federal Government or for known Government use.

Article 7. Data and Publication

7.1 Proprietary Information. GEGS shall place a Proprietary Legend on information delivered to NPS under this AGREEMENT which GEGS asserts is proprietary. The Proprietary Legend shall explicitly identify Proprietary Information and shall be in a form acceptable to NPS. NPS agrees that any properly legended Proprietary Information furnished by GEGS to NPS under this AGREEMENT, or in contemplation of this AGREEMENT, shall be used by NPS only for the purpose of carrying out this AGREEMENT. Under authority of Section 12 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710a) subsection (c), as amended, properly legended Proprietary Information, under the meaning of section 552(b)(4) of title 5, U.S.C., furnished by GEGS in the conduct of research or as a result of activities under this AGREEMENT shall not be disclosed, copied, reproduced or otherwise made available outside the Government in any form whatsoever without the consent of GEGS. NPS agrees to provide appropriate protection against the dissemination of information resulting from research and development activities conducted

under this AGREEMENT that would be a trade secret or commercial or financial information that is privileged or confidential if received from GEGS for a period of up to 5 years after development of such information, including exemption from subchapter II of chapter 5 of title 5, U.S.C. NPS agrees to use its best efforts to protect all such properly legended Proprietary Information from unauthorized disclosure. GEGS agrees that NPS is not liable for the disclosure of Proprietary Information which a Court of competent jurisdiction requires disclosed.

7.2 Release Restrictions. The U.S. Government shall have the right to use all Subject Data for internal Government purposes, but shall not release such Subject Data publicly except that: (i) such data must have been reviewed for security classification and been found to be unclassified; (ii) NPS in reporting on the results of research may publish unclassified, non-proprietary Subject Data in technical articles, theses and other documents to the extent it determines to be appropriate; and (iii) NPS may release such Subject Data where release is required pursuant to a request under the Freedom of Information Act (5 U.S.C. Section 552), with Proprietary Information protected under 15 U.S.C. Section 3710a(c)(7a).

7.3 Publication. NPS and GEGS agree to confer and consult prior to the publication of unclassified Subject Data to assure that no

Proprietary Information is released and that patent rights are not jeopardized. Prior to submitting a manuscript for review which contains the results of the research under this AGREEMENT, or prior to publication if no such review is made, each party shall be offered an ample opportunity to review such proposed publication and to file patent applications in a timely manner, as entitled under this AGREEMENT.

7.4 DTIC Access. GEGS agrees that it does not require access to the Defense Technical Information Center for purposes of this AGREEMENT.

Article 8. Representations and Warranties

8.1 Representations and Warranties of NPS. NPS hereby represents and warrants to GEGS as follows:

8.1.1 Organization. For the purposes of this AGREEMENT, NPS is a Federal laboratory of the United States Navy, an Agency of the Government of the United States. As such its purpose is a graduate education through programs of instruction and research;

8.1.2 MISSION. The performance of the activities specified by this AGREEMENT are consistent with the mission of NPS.

8.1.3 Authority. The NPS official executing this AGREEMENT has the requisite authority to do so.

8.1.4 Statutory Compliance. The Superintendent of NPS, prior to entering into this AGREEMENT, has given special consideration to entering into CRDA's with small business firms and consortia involving small business firms.

8.2 Representations and Warranties of GEGS. GEGS hereby represents and warrants to NPS as follows:

8.2.1 Corporate Organization. GEGS, as of the date hereof, is a corporation duly organized under the laws of the State of Delaware, and licensed to do business in the State of Texas.

8.2.2 Power and Authority. GEGS has the requisite power and authority to enter into this AGREEMENT and to perform according to the terms thereof.

8.2.3 Due Authorization. The Board of Directors and stockholders of GEGS have taken all actions required to be taken by law, GEGS's Certificate or Article of Incorporation, its bylaws or otherwise, to authorize the execution and delivery of this AGREEMENT.

8.2.4 No Violation. The execution and delivery of this AGREEMENT does not contravene any material provision of, or constitute a material default under any material agreement binding on GEGS or any valid order of any court, or any regulatory agency or other body having authority to which GEGS is subject.

Article 9. Termination

9.1 Termination by Mutual Consent. GEGS and NPS may elect to terminate this AGREEMENT, or portions thereof, at any time by mutual consent. In such event, the parties shall specify the disposition of all property, patents, and other results of work accomplished or in progress, arising from or performed under this AGREEMENT. Upon a termination by mutual consent, neither NPS nor GEGS shall make any new commitments and shall cancel, to the extent feasible, all outstanding commitments that relate to this AGREEMENT or the portions thereof mutually terminated, by the termination date, or as soon thereafter as feasible.

9.2 Termination by Unilateral action

9.2.1 Written Notice. Either party may unilaterally terminate this entire AGREEMENT at any time by giving the other party written notice not less than 30 days prior to the desired termination date. If GEGS unilaterally terminates this

AGREEMENT, any exclusive license entered into by the parties shall be simultaneously terminated unless the parties agree to retain such exclusive license.

9.2.2 New Commitments. NPS shall make no new commitments relevant to this AGREEMENT after receipt of a written termination notice from GEGS and shall cancel, to the extent feasible, all outstanding commitments and contracts by the termination date.

9.3 Termination Costs. Upon termination of this AGREEMENT for any reason, each Party will bear its own costs of termination. Each party will bear the costs of returning its property, which has been bailed under this AGREEMENT, to its own premises.

Article 10. Disputes

10.1 Settlement. GEGS and NPS recognize that disputes arising under this AGREEMENT are best resolved at the local working level by the parties directly involved. Both parties will endeavor to resolve disputes at this level. If resolution of such issues is not possible at the local level, then disputes shall be referred to higher authority within the respective organizations for resolution. If the parties are unable to resolve the dispute, the matter shall be referred to the Chief of Naval Research or his designee for resolution. Either party may ultimately pursue the matter in the United States Claims Court.

10.2 Continuation of Work. Pending the resolution of any dispute or claim pursuant to this Article, and unless one of the termination provisions of Article 9 has been elected, the parties agree that performance of all obligations shall be pursued diligently in accordance with the direction of the NPS signatory.

Article 11. Liability

11.1 Property. The U.S. Government shall not be responsible for damages to any property of GEGS provided to NPS or acquired by NPS pursuant to this AGREEMENT.

11.2 Sponsor's Employees. GEGS agrees to indemnify and hold harmless the U.S. Government for any loss, claim, damage, or liability of any kind involving an employee of GEGS arising in connection with this AGREEMENT, except to the extent that such loss, claim, damage or liability arises from the negligence of NPS or its employees. The liability of NPS for such loss, claim, or damage shall be governed by Federal law.

11.3 No Warranty. Except as specifically stated in Article 8, NPS makes no express or implied warranty as to any matter whatsoever, including the conditions of the research or any invention or product, whether tangible or intangible, made, or developed under this AGREEMENT, or the ownership, MERCHANTABILITY, or fitness for a particular purpose of the research or any invention or product.

11.4 Indemnification. GEGS holds the U.S. Government harmless and indemnifies the Government for all liabilities, demands, damages, expenses and losses arising against the U.S. Government out of the use by GEGS, or any party acting on its behalf or under its obligations, of NPS's research and technical developments or out of any use, sale or other disposition by GEGS, or others acting on its behalf or with its authorization, of products made by the use of NPS's technical developments, except to the extent that such liabilities, demand, damages, expenses or losses arise from the negligence of NPS or its employees. This provision shall survive termination of this AGREEMENT.

11.5 Force Majeure. Neither party shall be liable for any unforeseeable event beyond its reasonable control not caused by the fault or negligence of such party, which causes such party to be unable to perform its obligations under this AGREEMENT and which it has been unable to overcome by the exercise of due diligence, including, but not limited to, flood, drought, earthquake, storm, fire, pestilence, lightning and other natural catastrophes, epidemic, war, riot, civic disturbance or disobedience, strikes, labor dispute, or failure, threat of failure, or sabotage of the NPS facilities, or any order or injunction made by a court or public agency. In the event of the occurrence of such force majeure event, the party unable to perform shall promptly notify the other party. It shall further use its best efforts to resume performance as quickly as possible

and shall suspend performance only for such period of time as is necessary as a result of the force majeure event.

Article 12. Miscellaneous

12.1 No Benefits. No member of, or delegate to the United States Congress, or resident commissioner, shall be admitted to any share or part of this AGREEMENT, nor to any benefit that may arise therefrom.

12.2 Governing Law. The construction validity, performance and effect of this AGREEMENT for all purposes shall be governed by the laws applicable to the Government of the United States. Nothing herein shall relieve GEGS from complying with any Federal, State or local law or regulation.

12.3 Entire Agreement. This AGREEMENT constitutes the entire agreement between the parties concerning the subject matter thereof and supersedes any prior understanding or written or oral agreement relative to said matter.

12.4 Headings. Titles and headings of the Sections and Subsections of this AGREEMENT are for convenience of reference only and do not form a part of this AGREEMENT and shall in no way affect the interpretation thereof.

12.5 Waivers. None of the provisions of this AGREEMENT shall be considered waived by any party hereto unless such waiver is given in writing to all other parties. The failure of any party to insist upon strict performance of any of the terms and conditions hereof, or failure or delay to exercise any rights provided herein or by law, shall not be deemed a waiver of any rights of any party hereto.

12.6 Severability. The illegality or invalidity of any provisions of this AGREEMENT shall not impair, affect or invalidate the other provisions of the AGREEMENT.

12.7 Amendments. If either party desires a modification to this AGREEMENT, the parties shall, upon reasonable notice of the proposed modification by the party desiring the change, confer in good faith to determine the desirability of such modification. Such modification shall not be effective until a written amendment is signed by the Superintendent, NPS and by the GEGS official (or replacement) who signed the original CRDA. Prior to implementation, any changes or modifications to the CRDA are subject to review and approval of ONR.

12.8 Assignment. Neither this AGREEMENT nor any rights or obligations of any party hereunder shall be assigned or otherwise transferred by either party without the prior written consent of the other party except that GEGS may assign this AGREEMENT to the

successors or assignees of a substantial portion of GEGS's business interests to which this AGREEMENT directly pertains.

In the event that GEGS or its successors or assignees shall become, during the term of this AGREEMENT, a foreign-owned, controlled, or influenced (FOCI) organization (as such terms are defined in DoD 5220.22R (Industrial Security Regulations)), then GEGS shall immediately notify NPS to that effect. NPS will then have the right to terminate the AGREEMENT and to cancel all licenses granted to GEGS.

12.9 Notices. All notices pertaining to or required by this AGREEMENT shall be in writing and shall be signed by an authorized representative and shall be delivered by hand or sent by certified mail, return receipt requested, with postage prepaid, addressed as follows:

If to GEGS: Mr. Charley D. Stamps
Program Procurement Administrator
General Electric Government Services
1050 Bay Area Boulevard
Houston, Tx 77058

If to NPS: Superintendent
Code 08
Naval Postgraduate School
Monterey, CA 93943-5000

Any party may change such address by notice delivered to the other party as set forth above.

12.10 Independent Contractors. The relationship of the parties to this AGREEMENT is that of independent contractors and not as agents of each other or as joint venturers or partners. NPS shall maintain sole and exclusive control over its personnel and operations.

12.11 Use of Name or Endorsements. (a) GEGS shall not use the name of the NPS on any product or service which is directly or

indirectly related to either this AGREEMENT or any patent license or assignment associated with this AGREEMENT without the prior approval of NPS. (b) By entering into this AGREEMENT, NPS does not directly or indirectly endorse any product or service provided, or to be provided, by GEGS, its successors, assignees, or licensees. GEGS shall not in any way imply that this AGREEMENT is an endorsement of any such product or service.

Article 13. Duration of AGREEMENT and Effective Date

13.1 Duration of AGREEMENT.

This AGREEMENT shall become effective when signed and shall remain in effect until ninety days after the SLS-2 launch or 31 December, 1994 whichever occurs first, unless terminated as provided herein or extended by mutual agreement in writing.

The provisions of Articles 1, 3, 5, 6, 7, 9.2.2, 9.3, 11, 12, and 13.1 shall survive the termination of this AGREEMENT.

In the event that this AGREEMENT is terminated before the SLS-2 launch, unobligated funds will be returned to GEGS.

IN WITNESS WHEREOF, the parties have caused this
AGREEMENT to be executed by their duly authorized representative
as follows:

General Electric Corporation

Signature Charles V. Stans

Date 6-12-92

Naval Postgraduate School

Signature R. W. West

Date 6/10/92

APPENDIX B
STATEMENT OF WORK

STATEMENT OF WORK THERMOACOUSTIC LIFE SCIENCES REFRIGERATOR

1.0 INTRODUCTION

1.1 SCOPE

This statement of work defines the requirements for the development of the Thermoacoustic Life Sciences Refrigerator, (TALSR), for Spacehab. This is being accomplished under a Cooperative Research and Development Agreement, (CRDA), between Naval Postgraduate School, (NPS), and GE Government Services, (GEGS). Included are technical and program requirements for two specially constructed refrigeration units.

1.2 SCHEDULE

A TALSR Schedule is Appendix 1.

CDRA Completed	4/92
Technical Design Review	7/92
Flight Units Complete	3/93
Deliver to SPPF	4/93
STS-60 Launch	10/93

1.3 PROGRAM

The TALSR will be developed as a collaborative effort of NPS and GEGS. TALSR is intended to operate using environmentally safe inert gases as the working fluid and thus not violate the approaching ban on the production of chlorofluorocarbons. It is expected to be part of, (fly in), the Spacehab 2 mission and be housed in a "Single Rack" as defined in the Spacehab User's Manual, MDC W165B.

In the course of this program, it will be necessary for NPS and GEGS to collaborate on problem solutions in addition to satisfying NASA and/or JSC constraints on the program. It is the purpose of this section to define that interaction.

Program Goal: The goal of this program is the production of a Spacehab qualified, functioning thermoacoustic refrigerator which will be housed in the Standard Interface Rack. Specifically and ideally, the program should accurately determine whether thermoacoustics is a suitable refrigeration technique for spaceflight. Program technical requirements will be defined in Section 3.

Division of Responsibilities: NPS shall have primary responsibility for the design, fabrication, and testing of the thermoacoustic cooling engine. This

system includes but is not limited to the electrodynamic driver and associated power amplifier, the acoustic resonator containing hot and cold primary heat exchangers, the thermoacoustic "stack", and the refrigerator measurement and control electronics and sensors, including the experiment's internal microprocessor, its data recorder, and its software. In addition, NPS will transfer technology to GEGS during the design, fabrication, assembly, and testing phases of the project.

GEGS shall have primary responsibility for the design, fabrication, and testing of the TALSR insulated container used for storing samples (and heat load) within the refrigerator. The design specifications for the secondary heat exchanger which will be inside the insulated container will be furnished by NPS. The system, (engine plus box), will be assembled and tested in Monterey. GEGS shall have responsibility for the integration of the system within the Standard Interface Rack and subsequently that integrated package within the Spacehab Module (CMAM).

GEGS shall have administrative responsibility for interactions with both NASA and Spacehab, Inc. NPS shall support as required design reviews and technical equipment troubleshooting and analysis beyond the capability of GEGS with the understanding that GEGS has made every reasonable effort to resolve a problem before requesting such assistance. GEGS shall be responsible for overall project management and reporting to NASA.

Cooperative and Collaborative Arrangements: The groups at GEGS and NPS will function as a team. Since it is essential that each group interact with the other in a timely and proficient manner, travel and telecons will be arranged as necessary. In addition, when full time employee representation is needed for technology transfer, GEGS shall make the appropriate employees available. Both GEGS and NPS shall endeavor to best define the technology transfer on a continuing basis.

Funding: The funding of this project is subject to limitations and should be considered incremental. Should the project be terminated prior to completion, the equipment and assemblies built by NPS shall remain at NPS.

General: All materials used are subject to GE/NASA standards and approval. Detailed procedures of the fabrication, assembly and testing of TALSR shall be provided to GEGS prior to the delivery of hardware.

Sketches and/or machining quality drawings shall be provided GEGS as they become available. GEGS shall provide NPS sketches and/or machining quality drawings as they become available.

An engineering log which legibly and accurately records assembly processes, all tests and their results plus corrective actions and results will be maintained by NPS and kept up to date. This log will be made available upon request to GEGS and will be delivered with the refrigerator at project end.

A biweekly status and activity report will be due at GEGS Houston offices on or before the 1st and 15th of every month during the course of the project. An

overall project schedule shall be included with the report.

1.4 DELIVERABLES

<u>Item</u>	<u>Quantity</u>	<u>Description</u>
1	1	TALSR subsystems as defined in 1.3
2	1	Spare TALSR as defined in 1.3
3	1	Documentation Package including all drawings and Engineering Log

2.0 APPLICABLE DOCUMENTS

MDC W5165B	Spacehab User's Handbook
NSTS 1700.7B	Safety Policy and Requirements for Payloads Using the Space Transportation System
KHB 1700.7A	Space Transportation System Payload Ground Safety Handbook
KHB 1700.7B	Safety Policy Briefing on Selected Changes
NSTS 13830B	Implementation Procedure for NSTS Payloads System Safety Requirements for Payloads Using the Space Transportation System
JSCM-8080 4/1/91	JSC Design & Procedural Manual (Per applicability Matrix only)

3.0 TECHNICAL REQUIREMENTS

Design and testing of the devices shall conform to the JSCM 8080 standards matrix in appendix B where applicable. These devices shall also conform to the requirements in the SPACEHAB/Experiment Interface Definition Document (MDC91W5023B). The refrigerator/freezer will be designed to be as reliable as possible, considering the schedule and mission constraints and will be designed with backup systems which allow for the greatest probability of mission success with the least amount of crew impact.

3.1 Operational Performance

- 3.1.1 The TALSR shall maintain a refrigerated compartment between -22°C to +10°C**
- 3.1.2 Set point temperatures shall be adjustable to 0.5 °C and have an accuracy of +/- 1 °C of set point at all points within the refrigerated space.**
- 3.1.3 The temperature display must be continuously monitored and visible at a distance of 10 feet. Data outputs must be provided to for monitoring and recording operational parameters.**

3.2 Thermal

- 3.2.1 The refrigeration capacity delivered to the cold volume (box) shall be not less than 700 BTU/hr at 4 °C and 400 BTU/hr at -22 °C.**
- 3.2.2 Maximum air outlet temperature for the experiment fans shall not exceed 120 °F**

3.3 Electrical

- 3.3.1 The TALSR shall operate on 28 VDC +/- 4 VDC and shall not exceed 700 W maximum intermittent and 400 W continuous power.**
- 3.3.2 Equipment shall be supplied power through one main circuit breaker located on the equipment front panel.**
- 3.3.4 Primary power return/neutral lines shall be isolated from each other and spacecraft structure by at least 1 megohm and shall be shunted to structure by less than 2 microfarads.**
- 3.3.5 Isolation between each primary power line and each secondary power line shall be greater than 1 Mohm shunted by less than 1nF.**
- 3.3.6 For boxes or devices (individually bonded to spacecraft structure) receiving secondary power from another box, the isolation requirements imposed for spacecraft supplied power listed in 3.3.4 shall apply to such secondary power.**
- 3.3.7 Signal power shall be secondary power (i.e., power derived from primary power via isolating converters), and shall be grounded to structure at and only at the converter (single point ground). Exceptions can be made to this requirement when a converter is being added to equipment solely to comply with this requirement and where very few signal are involved.**

- 3.3.8** Signal receivers for signals from other boxes must isolate the signal and return lines from spacecraft structure by at least 1 megohm. In cases where system performance is degraded by this amount of isolation and the signals are carried by twisted shielded pairs into a balanced input, NASA may reduce this requirement to 4 kilohms.
- 3.3.9** Signal transmitters for signal to other boxes shall be referenced to signal ground which, for each related secondary power supply, is grounded to structure at a single point.
- 3.3.10** Signal transmitters shall not be referenced to the power return.
- 3.3.11** Spaceflight equipment interface circuits receiving spacecraft commands or signals shall maintain an isolation between these signal lines or return lines and spacecraft structure in both powered and unpowered states. For differential serial digital commands/signals the isolation measured at the experiment box shall be greater than 5 K ohms shunted by less than 1 nF.
- 3.3.12** Signals between experiment boxes which are physically separated and individually bonded, shall be isolated between signal or return lines and spacecraft structure in both powered and unpowered states. This requires differential serial digital commands/signals to be isolated at the input of the receiving box by greater than 5K ohms shunted by less than 1 nF. For discrete and analog inputs the isolation measured at the receiving box input shall be greater than 1 megohm shunted by less than 1 nF.
- 3.3.13** All panel mounted bulkhead connector shells shall be electrically bonded to panel/bulkhead with a DC resistance of less than 2.5 milliohms. The DC resistance between the mated halves of the connector shells must not exceed 50 milliohms.
- 3.3.14** The primary overload device shall be rated to interrupt before the associated spacecraft device.
- 3.3.15** Use of commercial EEE parts is acceptable. Burn-in is required at the system level and is recommended at the subassembly level.
- 3.3.16** A data connector shall be provided to transmit appropriate parametric data which is compatible with the SPACEHAB data system.
- 3.3.17** Secondary power or signal grounds when isolated from primary power, must be connected to structure ground at one point, (single point ground).

3.3.18 Twisted pair shields shall be connected to structure/chassis through a pin in the connector.

3.3.19 For shields over a group of wires, the shield shall be connected to the connector housing at both ends.

3.3.20 If coaxial cable is used, the outer conductor must be terminated at both ends and at all bulkheads.

3.4 STRUCTURAL & MECHANICAL

Threaded fasteners size 8 and larger in the primary or secondary load path must be tested in accordance with JSC-23642B, JSC Fastener Integrity Testing Program. GEGS will provide tested fasteners to NPS upon request.

All fasteners connecting safety critical structures must be secured with a positive locking device.

Mounting of all equipment shall be subject to the review and approval of GEGS in order to maintain an accurate stress analysis.

3.4.1 All panel connectors shall be supplied with protective covers and those connectors not mated inflight shall be tethered.

3.4.2 All circuit boards shall be conformally coated with flight approved coating material.

3.4.3 Front panel controls shall be protected against accidental operation. Front panel controls may extend 1 inch from the panel (max) .

3.4.4 Limiting dimensions and weights shall be agreed by GE and NPS subject to design review prior to construction.

3.4.5 No sharp edges are to be exposed to the crew.

3.4.6 Screens shall be provided to protect the equipment from debris at the inlet and exit of the external water loop, at appropriate places in the closed coolant loop and at the intake of the cooling fans.

3.5 SAFETY

3.5.4 Safety per NSTS1700.7B

3.5.1 NPS shall provide a list of components considered to be single point failures for the successful operation of the refrigerator. An explanation of the effect of each

failure and any analysis that may be required to justify the unit's continued safety shall also be included.

- 3.5.2 TALSR must demonstrate that it remains fail safe with loss of cooling services.
- 3.5.2 NPS shall provide as built schematics of the electrical system and a wiring analysis which states that the electrical system is properly protected from shorts per MDC91W5023B.
- 3.5.3 All devices shall be protected from overheating with appropriate thermal and/or electrical protection. Supporting documentation shall be provided to GEGS which describes the method(s) of protection for each device
- 3.5.4 The temperature of all surfaces accessible to crew touch must be between 39°F and 113 °F during both normal operations and system failure. Inaccessible external surfaces shall not exceed 120°F. The surface temperature shall be kept above the dew point defined in Table 6.1 of MDC91W5023B during both normal operations and system failure.
- 3.5.5 Compartments containing fluids shall be designed to contain the fluids in the event of a leak from the fluid system.
- 3.5.6 Fire suppression tubing shall be provided which allows a crew member to extinguish internal equipment fires with a portable fire extinguisher from a single access hole in the front panel.
- 3.5.7 All pressure systems shall be tested to the appropriate factor of safety.
- 3.5.8 TALSR shall be capable of withstanding depressurization to 10^{-6} at a rate of 2 millibar/sec and repressurization at the same rate.
- 3.5.9 TALSR must demonstrate that it operates safely over worst case input steady state voltages and input power ripple and transient conditions. It must also remain fail safe with loss of input power.

3.6 MATERIALS, PARTS AND PROCESSES

- 3.6.1 A list of all materials used shall be submitted to GEGS/NASA for review and approval. Potentially hazardous materials shall be identified and evaluated as part of the technical design review. The following materials are prohibited from use in SPACEHAB experiment hardware.

Cadmium or cadmium plating
Mercury
Magnesium or Magnesium alloys
Zinc or Zinc plating
Polyvinyl chloride (PVC)
Sulfur-containing compounds
Kapton-insulated wire

3.6.3 All controls shall be easily readable and adjustable without tools. Guards shall be provided to prevent inadvertent operation.

3.6.4 All element of the front panel shall be able to withstand specified kick/push-off loads.

3.7 ENVIRONMENTAL TESTS

3.7.1 Environmental tests shall be performed at NPS in compliance with MDC91W5023B as their in-house facilities permit. The remaining testing will be coordinated by GEGS to be performed at an appropriate facility.

4.0 QUALITY ASSURANCE

4.1 GEGS will be responsible for Quality Assurance requirements concerning or in connection with the development of TALSR. If a process, procedure, or document does not meet such standards, NPS will assist GEGS in corrective action. The overall Quality Plan under which this equipment shall be developed and fabricated is currently under review. When the Quality Plan is approved, it will become applicable to this Statement of Work.

5.0 RELIABILITY

5.1 GEGS will be responsible for transmitting in writing any Reliability requirements to NPS. These requirements will become applicable under this Statement of Work.

6.0 Section 3.5

7.0 CONFIGURATION MANAGEMENT

7.1 GEGS shall be responsible for supporting project Configuration Management.

PROJECT: RJOOSO75.S		1992												1993											
NASA MONITOR: Proctor, D.		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
GE PROJECT ENGINEER: Mims, J.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GEGS ATP																									
Assesment of NPS flight																									
Procurement																									
Subcontractor ATP																									
Define Requirements																									
ThermoAcoustic Design																									
Structure design																									
Structure Fab																									
ThermoAcoustic Fab																									
Cooler/Structure Integration																									
SpaceHab Delivery																									
Performance/Cert Testing																									
SpaceHab Integration																									
Prepare Documentation																									
Real Time Mission Support																									
STS-60 Launch																									

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APPENDIX C

**TEST AND VERIFICATION REQUIREMENTS FOR
JSCM 8080 DESIGN STANDARDS**

TABLE III. TEST AND VERIFICATION REQUIREMENTS FOR JSCM 8080 DESIGN STANDARDS

JSCM 8080 Spec	JSCM 8080 / JSC DESIGN AND PROCEDURAL STANDARDS MANUAL 4/91 Design Standards	Verification Method †		
GENERAL				
G-1	Equipment Accessibility for Maintenance	I		
G-2	Separation of Redundant Equipment	N/A		
G-3	Systems Checkout Provisions	I		
G-4	Protection of Spacecraft Electrical and Mechanical Systems From Debris	I		
G-5	Interior Design of Spacecraft for Cleanliness	N/A		
G-6	Redundancy Requirements	N/A		
G-7	Time Displays	N/A		
G-8	Redundant Paths - Verification of Operation (G-8)	N/A		
G-9	Shatterable Material - Exclusion From Habitable Compartment	A		
G-10	Control Of Limited-Life Components	A		
G-11	Procurement Document Identification for Manned Spaceflight Vehicle Items	N/A		
G-12	Application of Previous Qualification Tests	N/A		
G-13	Shipping and Handling Protection for Spaceflight Hardware	I		
G-14	Identification and Classification of Flight and Nonflight Equipment	I		
G-15	Equipment Failure - Verification of Flight Readiness	A		
G-16	Operating Limits on Temperature-Controlled Equipment	A&T		
G-17	Separate Stock for Spaceflight Parts and Materials	I		
G-18	Safety Precautions - Test and Operating Procedures	A		
G-19	Special Processes - Identification of Drawings	N/A		
G-20	Spacecraft Equipment - Protection from System Liquids	A&I		
G-21	Spacecraft Equipment - Moisture Protection	A		
G-22	Parts Identification	N/A		
G-23	Pressure Garment Wiring - Ignition of Materials by Electrical Current	N/A		
G-24	Ground Support Equipment and Airborne Support Equipment Protective Devices	N/A		
G-25	Thermal Design and Analysis - Thermal Parameters	N/A		
G-26	Internally Generated Radiation	N/A		
G-27	Fire Control	A		
G-28	Sealing - Solid Propellant Rocket Motors	N/A		
G-29	Reentry Propulsion Subsystem	N/A		
G-30	Switch Protection Devices	I		
G-31	Detachable Crew-Operated Tools - Restriction in Spacecraft	I		
G-32	Measurement Sys That Display Flight Info to the Crew - Indication of Failure	N/A		
G-33	Surface Temperatures	A		
G-34	Extravehicular Activity Electronic Connectors	N/A		
G-35	Enclosure Panels External to the Habitable Modules	N/A		
G-36	Thermal Blankets - Extravehicular Activity	N/A		
G-37	Verification of Adequate External Visibility	N/A		
G-38	Press. or Repress. - Precluding Ingress of Undesirable Elements	N/A		
G-39	Lightning Protection Design	N/A		
G-40	Radioactive Luminescent Devices	N/A		
G-41	Acoustic Noise Criteria	T		
G-42	Solar Wind Environment	N/A		
G-43	Centralized Subsystem Controls	I		
G-44	Altitude Control Authority	N/A		
G-45	Solid Propellant Rocket Motors - Ignition Capability With Unsealed Nozzles	N/A		
G-46	Separation Sensing System - Structural Deformation	N/A		
G-47	Gyroscopes - Verification of Rotational Speed or Drift Rate	N/A		
G-48	Onboard Experiments - Required Preinstallation Checklist	A&T		
G-49	Temperature and Pressure Monitoring Reqs. of Hydrogen Peroxide Systems	N/A		
G-50	Direct Procurement of Parts	N/A		
G-51	Flight Hardware - Restriction on Use for Training	N/A		
G-52	Reuse of Flight Hardware	N/A		
ELECTRICAL				
E-1	Mating Provisions for Electrical Connectors	I		
E-2	Protection of Severed Electrical Circuits	N/A		
E-3	Electrical and Electronic Devices - Protection from Rev. Polarity/Improper...	I		
E-4	Electrical Connectors - Moisture Protection	A		
E-5	Electrical Connectors - Pin Assignment	A		
E-6	Corona Suppression	A		
E-7	Tantalum Wet Slug Capacitors - Restriction on Use	A		
E-8	Electrical and Electronic Supplies and Loads - Verification Tests	I		

TABLE III. TEST AND VERIFICATION REQUIREMENTS FOR JSCM 8080 DESIGN STANDARDS

JSCM 8080 Spec	JSCM 8080 / JSC DESIGN AND PROCEDURAL STANDARDS MANUAL 4/01 Design Standards	Verification Method †		
E-9	Electrical Circuits - Deenergizing Requirement	A		
E-10	Cleaning of Electrical and Electronic Equipment	A		
E-11	Protective Covers or Caps for Electrical Receptacles and Plugs	I		
E-12	Electrical Connectors - Disconnection for Troubleshooting and Bench Testing	I		
E-13	Bioinstrumentation Systems - Crew Electrical Shock Protection	N/A		
E-14	Electrical Wire Harnesses - Dielectric Tests	T		
E-15	Electrical Power Distribution Circuits Overload Protection	A		
E-16	Testing Protective Devices for Solid-State Circuits	N/A		
E-17	Electrical and Electronic Piece Parts - Closure Construction	N/A		
E-18	Circuitry for Automatic Shutdown of Launch Vehicle Engine(s)	N/A		
E-19	Equipment Design - Power Transients	A&T		
E-20	Control of Electrostatic Discharge for Electronic Parts and Assemblies	N/A		
E-21	Electrical Connectors	I		
E-22	Ionizing Radiation Effects	N/A		
E-23	Transistors - Selection of Types	N/A		
E-24	Electrical Wire and Cable Acceptance Tests	N/A		
FLUIDS				
F-1	Flow Restriction Requirements - Pressurized Sources	N/A		
F-2	Moisture Separators in a Zero-Gravity Environment	N/A		
F-3	Service Points - Positive Protection From Interchangeability of Service Lines	N/A		
F-4	Ground Service points - Fluid Systems	N/A		
F-5	Fluid Lines - Separation Provisions	N/A		
F-6	Temp. and Press. Monitoring Reqs. for Potentially Hazardous Reactive Fluids	N/A		
F-7	Capping of Servicing and Test Ports	N/A		
F-8	Fluid System Components Whose Function is Dependent on Direction of Flow	N/A		
F-9	Spacecraft Venting-Induced Perturbing Forces	N/A		
F-10	Nozzles and Vents - Protection Prior to Launch	N/A		
F-11	Fluid Supplies - Verification Tests	N/A		
F-12	Protection of Pressurized Systems from Damage due to Pressurant Depletion (GSE)	N/A		
F-13	Crew Cabin Module Pressure - Venting Restriction	N/A		
F-14	Crew Cabin Module Ventilating Fans - Protection From Debris	I		
F-15	Separation of Hypergolic Reactants	N/A		
F-16	Fluid Line Installation	A&I		
F-17	Cleanliness of Flowing Fluids and Associated Systems	N/A		
F-18	Pressure Relief Valves - Standardization of Testing	N/A		
F-19	Protection for Tubing, Fittings, and Fluid System Components	A&I		
F-20	Fluid Systems - Cleanliness	I		
F-21	Purge Gases - Temperature and Humidity Requirements	N/A		
F-22	Pressure Garments - Protection Against Failure Propagation	N/A		
F-23	Qualification Fluid	A&T		
F-24	Fluid Systems - Design for Flushing and Draining	I		
F-25	Toxicity - Fluids Contained in Systems in the Crew Compartment	A		
F-26	Atmospheric Pressure and Composition Control	N/A		
F-27	Liquid or Gas Containers - Verification of Contents	I		
F-28	Use of Halogen Method for Coolant System Leak Detection	N/A		
F-29	Filter Protection of Active Fluid Components	I		
F-30	Pressure Relief for Pressure Vessels	N/A		
MATERIALS AND PROCESSES				
M/P-1	Material Selection, Review, and Drawing Sign-Off	A		
M/P-2	Flammability of Wiring Material	A		
M/P-3	Toxicity of Materials Used in Crew Compartments - Wire, Insulation, Ties....	A		
M/P-4	Metals and Metal Couples - Restriction on Use	A		
M/P-5	Solutions Which Contain Ethylene Glycol - Req for Silver Chelating Agent	A		
M/P-6	Toxicity - Req for Nonmetallic Materials for Use Within Crew Compart.	T		
M/P-7	Material Detrimental to Electrical Connectors	A		
M/P-8	Leak Detectors - Wetting Agents	A		
M/P-9	Breathing Systems - Requirement to Test for Mercury Contamination	T		
M/P-10	Liquid Locking Compounds - Restrictions and Controls	A		
M/P-11	Pressure Vessel Documentation	A&T		
M/P-12	Multilayer Blanket Bake-Out	N/A		
M/P-13	Pressure Vessel Design	A&T		

† A= analysis, I= inspection, T= test

TABLE III TEST AND VERIFICATION REQUIREMENTS FOR JSCM 8080 DESIGN STANDARDS

JSCM 8080 Spec	JSCM 8080 / JSC DESIGN AND PROCEDURAL STANDARDS MANUAL 4/91 Design Standards	Verification Method †		
M/P-14	Silicate Ester Coolant System Design	A		
M/P-15	Mercury - Restriction on Use	A		
M/P-16	Restriction on Coatings for Areas Subject to Abrasion	A&I		
M/P-17	Radiographic Inspection of Brazed and Welded Tubing Joints	N/A		
M/P-18	Etching Fluorocarbon Insulated Electric Wire	I		
M/P-19	Spacecraft material - Restriction on Use of Polyvinyl Chloride	A		
M/P-20	Titanium or Its Alloys - Prohibited Use With Oxygen	A		
M/P-21	Beryllium - Restricted Used Within Crew Compartment(s)	A		
M/P-22	Brazed Joints - Identification Marks	N/A		
M/P-23	Pressure Vessels - Materials Compatibility and Vessel Qualification Tests	A&T		
M/P-24	Cadmium - Restriction on Use	A		
M/P-25	Pressure Vessels - Nondestructive Evaluation Plan	A		
M/P-26	Repair of Sandwich-Type Structures	N/A		
MECHANICAL AND STRUCTURAL				
M/S-1	Equipment Containers - Design for Rapid Spacecraft Decompression	I		
M/S-2	Alignment of Mechanical Systems	A		
M/S-3	Wire Bundles - Protective Coating	I		
M/S-4	Hatches - Repeated Use	N/A		
M/S-5	Threaded Fittings - Restrictions on Release of Particles and Foreign Material	A		
M/S-6	Exposed Sharp Surfaces or Protrusions	I		
M/S-7	Windows and Glass Structure	N/A		
M/S-8	Penetration of Inhabited Spacecraft Compartments	N/A		
M/S-9	Mechanisms	N/A		
M/S-10	Functional Doors That Operate in Flight	N/A		
M/S-11	Meteoroid Protection Levels for Structures	N/A		
M/S-12	Spacecraft Recovery Hoist Loops	N/A		
M/S-13	Lifting and Hoisting Ground Support Equipment Identification	N/A		
M/S-14	Structural Analysis	A		
M/S-15	Stainless Steel Tubing - Method of Joining	I		
M/S-16	Pressure Vessels - Negative Pressure Damage	A		
PYROTECHNICS				
P-1	Explosive Devices - Arming and Disarming	N/A		
P-2	Pyrotechnic Devices - Preflight Verification Tests at Launch Sites	N/A		
P-3	Wire Splicing	N/A		
P-4	Explosive Devices - Packaging Material	N/A		
P-5	Explosive devices - Identification Requirements	N/A		
P-6	Protection of Electrical Circuitry for Explosive Dev. Employing Hot Bridgewire	N/A		
P-7	Explosive Devices - Color Coding Requirements	N/A		

† A= analysis, I= inspection, T=test

APPENDIX D
ONR DRAFT CRDA GUIDELINES

DRAFT

DRAFT LETTER

ONT-
17 J1

From: Chief of Naval Research
To: Distribution

Subj: Guidance for Cooperative Research and Development
Agreements (CRDAs)

Ref: (a) Public Law 96-480, "Stevenson-Wydler Technology
of 1986," 20 Oct 86
(b) Executive Order 12591, "Facilitating Access to Science
and Technology," 10 Apr 87
(c) DoD 3200.12-R-4 of 27 Dec 88, Domestic Technology
Transfer Program Regulation (NOTAL)
(d) SECNAVINST 5700.16, Domestic Technology Transfer

Encl: (1) Department of the Navy Cooperative Research and
Development Agreement (CRDA) Guidance

1. Enclosure (1) provides draft guidance for the preparation of Cooperative Research and Development Agreements (CRDAs) permitted and encouraged under references (a)-(d). It does not require adherence to a rigid format. Instead it presents a preparation process whereby required elements are identified, while at the same time maintaining sufficient flexibility to allow Commands to tailor CRDAs to best accommodate individually proposed cooperative efforts.

2. Your comments to improve CRDA preparation procedures are welcome. Please mail them or call me at 703-696-4448.

R. M. Culpepper

Distribution:

(All Commands having ORTAs)

CRDA Preparation Guidance

INTRODUCTION

This guidance is provided to facilitate preparation of CRDAs, and to expedite the review process. The preparation of each Navy CRDA should be tailored to the technical objectives and particular circumstances pertinent to the proposing participants.

With few exceptions, each CRDA has one or more unique features, so that it has not been possible to create a generic, fill-in-the-blanks model for CRDAs. However, this Attachment presents a format containing the principal elements that DON Components are to explicitly address when preparing CRDAs. Other elements may be added as appropriate and necessary for the benefit, understanding, and protection of the participants in order to help ensure a successful cooperative venture.

To date we have seen five relatively distinct types of CRDAs, distinct, that is, as related to the subject matter and general purpose of the agreement. This distinction is useful in determining some of the salient features of each type of CRDA, as noted parenthetically below:

Types

- (1) Co-development and marketing of a product (requires special attention to patents and royalties) ↗
- (2) Co-development/modification and marketing of software (requires special attention to copyrights and fees)
- (3) Use of Navy facilities (requires special attention to liability and definition of responsibilities)
- (4) Funds to Navy as principal R&D performer (requires special attention to payment amounts and schedule)
- (5) Study/Investigation (involves information access only, with limited Navy consultation - see Attachment 3 for details)

Within the following format several Articles are considered common to all CRDAs, and the given wording requires no changes to be acceptable for inclusion in any CRDA. Nonetheless, flexibility is permitted in deviating from these phrases, provided that intent and legality is maintained. Such deviations should be identified in the approval request letter when submitting the CRDA. These common Articles, keyed to the structure that follows, are listed below:

<u>Article No.</u>	<u>Article Heading</u>	<u>Page</u>
16.	Disposal of Toxic Wastes.....	15
18.	Entire Agreement.....	15
19.	Governing Laws.....	15
22.	Assignment/Sub-Contracting.....	16
23.	Severability.....	16
24.	Headings.....	17
25.	No Benefits.....	17
26.	Independent Contractors/Entities.....	17
27.	Use of Name or Endorsement.....	17
28.	Waivers.....	17
29.	Force Majeure.....	17
31.	Covenant Against Contingent Fees.....	18
32.	Covenant Against Gratuities.....	19
33.	Notices.....	19
34.	Assignment.....	19

Contents of the remaining CRDA Articles are discretionary to the extent they are to be individualized for a given CRDA. In some cases sample entries are provided to illustrate the type of information required. These are so marked, and are keyed to the above CRDA types as appropriate. Since these samples may or may not be appropriate to a particular CRDA, careful consideration must be given as to whether, as written, they are appropriate to the case in point.

Serious consideration should also be given to the inclusion of ALL the Articles in all CRDAs, even though some Articles may not appear to be relevant in a particular CRDA. There are two reasons for this suggestion. First, it is not always obvious whether an Article might not become relevant at some time in the course of the CRDA; and second, experience has shown that a CRDA which has been approved and signed is often used as the model or structure for a new CRDA. Thus the inclusion of ALL Articles ensures that important ones are not omitted in other CRDAs that may follow, and that may differ in subject or type from the original.

All CRDAs will be assigned a unique identification and control number by the originating DON Component in accordance with the following format:

NCRDA-XX-YYYY-ZZZ,

Where: NCRDA = Navy issued CRDA

XX = last two digits of Fiscal Year issued

YYYY = four letter acronym/initials of issuing Component

ZZZ = three digit serial numbering starting at 001. Note: Investigative CRDAs, discussed in Attachment 4, are to be identified by an "I" in the first character position.

Example: NCRDA-90-NSWC-001, or
NCRDA-90-NSWC-I01

- NP65-001

CRDA STRUCTURE

1. Title Page. (Sample)

COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENT
BETWEEN
(NAVY COMPONENT(S))
AND
(PARTNER(S))

Agreement Title:

Agreement Number: NCRDA-XXXX-YY-ZZZ

2. Table of Contents. (Sample)

	Page
Article 1. Introduction.....	2
Article 2. Background.....	2
Article 3. Objectives.....	2
Article 4. Recitals.....	2
Article 5. Definitions.....	3
Article 6. Cooperative Effort Description.....	4
Article 7. Developed Products.....	5
Article 8. Representations and Warranties.....	5
Article 9. Funding.....	6
Article 10. Title to Property.....	7
Article 11. Data/Publications.....	8
Article 12. Copyrights.....	10
Article 13. Royalties.....	10
Article 14. Patent Rights.....	12
Article 15. Exclusive License.....	13
Article 16. Disposal of Toxic Wastes.....	14
Article 17. Noncompeting.....	14
Article 18. Entire Agreement.....	14
Article 19. Governing Laws.....	14
Article 20. Disputes.....	15
Article 21. Termination.....	15
Article 22. Assignment/Sub-Contracting.....	15
Article 23. Severability.....	16
Article 24. Headings.....	16
Article 25. No Benefits.....	16
Article 26. Independent Contractors/Entities.....	16
Article 27. Use of Name or Endorsement.....	16
Article 28. Waivers.....	17
Article 29. Force Majeure.....	17
Article 30. Liabilities.....	17
Article 31. Covenant Against Contingent Fees.....	17
Article 32. Covenant Against Gratuities.....	18
Article 33. Notices.....	18
Article 34. Assignment.....	18
Article 35. Duration and Effective Date.....	18

APPENDIX A. Cooperative Effort Description.....A-1
(Statement of Work)

ENCLOSURE (1)

Department of the Navy
Cooperative Research & Development Agreement (CRDA) Guidance
DRAFT FOR REVIEW

1. General Principles in CRDA Planning and Preparation

(a) Authorization

Reference (a), as implemented by reference (b) and codified as 15 U.S. Code Section 3710a, permits Government-operated Federal laboratories to enter into cooperative research and development agreements (CRDAs) with other Federal agencies, units of State or local governments, private industry, public and private foundations, academia, and individuals. References (c) and (d) promulgate this authority and provide policy and general guidance for Department of the Navy (DON) components. This guidance specifically address the preparation of CRDAs.

(b) What a CRDA is and is not

Under a CRDA between one or more Federal laboratories and one or more non-Federal parties, the Government, through its laboratories, provides personnel, services, facilities, equipment, or other resources with or without reimbursement (but not funds to non-Federal parties), and the non-Federal parties provide funds, personnel, services, facilities, equipment, or other resources toward the conduct of specified research or development efforts that are consistent with the missions of the laboratory.

The term CRDA does not include a procurement contract or cooperative agreement as those terms are used in title 31 U.S. Code Sections 6303-6305. Thus the Federal Acquisition Regulation (FAR) and the DoD FAR Supplement are not applicable to these agreements.

(c) Responsibilities in the Preparation of a CRDA

(i) Formal Responsibilities

CRDAs must be directed toward the conduct of specified research or development efforts which are consistent with the missions of the participating activity. Per reference (e), CRDA implementation shall advance program missions at the activity, including any national security mission. Each activity shall determine criteria, suitability, and appropriateness of the proposed CRDA consistent with the activity's mission.

ENCLOSURE (1)

The Chief of Naval Research, under reference (d), has approval and delegation of signature authority for DON CRDAs. This authority is re-delegated to individual DON component Commanding Officers pending the outcome of an Office of the Chief of Naval Research (OCNR) review of each proposed CRDA. This review will be conducted within a 30-day period after receipt to the proposed CRDA by the OCNR.

Each activity shall conduct an internal legal review of each proposed CRDA for consistency with reference (a) and conflict of interest statutes, prior to submission for OCNR review. An activity's authorizing agent for a CRDA is responsible for ensuring that no conflict of interest exists in the execution of that CRDA.

CRDAs need not be competed since the Federal Acquisition Regulation (FAR) and the Department of Defense FAR Supplement are not applicable to the agreements, per references (a) and (c). However, to avoid the appearance of partiality and to attain maximum benefits from Navy participation, it is recommended that multiple sources be considered prior to negotiating CRDAs. Even though not required, a Commerce Business Daily announcement (under "Special Notices") may be advisable if deemed necessary to avoid the appearance of conflict of interest or unfair competitive advantage, or if desired to solicit for other qualified and interested partners for the cooperative effort.

No derivative, consultant or "subcontract" effort is permitted under a CRDA. Only signatories to a CRDA may participate.

A Navy component will not use CRDAs to limit competition among sources in any subsequent procurement in the same subject area and will not give the participant preferred status in any such procurement.

(ii) Suggested Responsibilities

A CRDA is a negotiated agreement with a mutually beneficial objective for both the Government and non-Government participant. Since the Federal Acquisition Regulation (FAR) and the DoD FAR Supplement do not apply to such agreements, it is particularly important that the CRDA preparation process fairly and properly protect the interests of both parties in meeting the technical objective.

A successful agreement depends on a mutually understood and beneficial document that has sufficient management and technical staff support of all participants. In addition, the trust and commitment of all parties is necessary to facilitate proper execution of the agreement. The technical and legal staffs of both the Federal and the non-Federal partners should consider it their responsibility to ensure that the agreement fulfills these concepts.

The technical sponsors, Navy and non-Government, should have major roles in drafting CRDA Statements of Work, and in considering the distribution of benefits and rights between the Federal and the non-Federal partners.. A laboratory's legal staff should have responsibility for support and advice in addressing proper treatment of the legal aspects of the CRDA, particularly patent law and intellectual property rights.

2. Policy Considerations

(a) Government Acquisition of Licenses

As a matter of policy, Navy CRDAs will include provisions whereby the Government acquires at least a nonexclusive, irrevocable, worldwide, paid-up license to practice the invention or have the invention practiced throughout the world by or on behalf of the Government in any subject invention made by a collaborating party or an employee of a collaborating party. A subject invention means any invention conceived or first actually reduced to practice in the performance of work under the CRDA.

(b) What the Navy Component is authorized to do

Subject to national security limitations, Navy components may, under CRDAs, accept, retain, and use funds, personnel, services, and property from collaborating parties and provide personnel, services, and property to collaborating parties. Royalties or other income received from the licensing or assignment of inventions under CRDAs shall be retained by the participating DON component. In general, this translates to a 20% share for inventors and 80% to their parent activity. Such funds are not discretionary and shall be used for the prescribed purposes of references (a), (c), (d), and (f).

(c) What the Non-Federal Participant does

Non-Federal participants may use discretionary funds, including IR&D funds, to support such agreements, and can recover those costs through overhead or general and administrative charges on DoD contracts, especially as these agreements support similar or related efforts that otherwise qualify for the Industry Independent Research and Development program.

3. Considerations for the Navy Component

(a) Requirements on the Navy Component

In deciding CRDA participation, activities shall:

(1) give special consideration to small business firms, and consortia involving small business firms;

(2) give preference to business units located in the U.S. which agree that products embodying inventions made under the CRDA or produced through the use of such inventions will be manufactured substantially in the U.S.; and

(3) follow the guidance in Attachment 2 with regard to controls on the release of classified and unclassified militarily critical technology to potential CRDA partners subject to the control or influence of a foreign company or government. Disclosure of military information to foreign governments, organizations or individuals is controlled by references (h)-(k). Accordingly, applicants under foreign ownership, control or influence must comply with security procedures and DoD policy prescribed in Attachment 2, and with references (k) and (l) to qualify as participants for investigative CRDAs. Attachment 2 also deals with the avoidance of detrimental effects on the U.S. economy in engaging in CRDAs with foreign owned, controlled or influenced U.S. companies.

(4) No trade secrets or commercial or financial information obtained in the conduct of research under CRDAs shall be disclosed without permission of the non-Government participant, as per reference (e). Further, this information can be protected for up to five years from "Freedom of Information Act" requests, as authorized in 15 U.S.C. 3710a.

(5) Classified information and unclassified sensitive information protected by law, regulation, or Executive Order shall be appropriately safeguarded, as per reference (e). CRDA participants requiring access to classified information must comply with current security procedures for the handling and protection of classified information, as prescribed in reference (g). This must include an active and specific DD Form 441 (Facility Clearance). The sponsoring DON Component will prepare a DD Form 254, Contract Security Classification Specification to provide security guidance to the non-Government participant. Make the following entry changes in the Form 254:

2.a. Line out "Prime Contract." Enter
"Cooperative Research and Development Agreement."
2.b. Line out "Prime Contract." Enter CRDA
number.

Remainder of the Form. Fill out with appropriate information on the non-Government CRDA partner wherever the Form refers to the Prime Contractor or Contractor.

11.o. Enter the following in 11.o. (Remarks):
"The terms "prime contract or contract" mean this Navy Cooperative Research & Development Agreement (CRDA), which is not a procurement contract or grant. The terms "Prime Contractor or Contractor" mean the non-Government partner in the CRDA.

(6) After approval by all participants, one copy of the agreement shall be sent to the following OCNR code:

Office of the Chief of Naval Research
Attn: Code ONT-26
800 N. Quincy Street
Arlington, VA 22217-500

(7) The sponsoring DON Component shall provide a description of any CRDA to the Defense Technical Information Center (DTIC) Work Unit Information System within 30 working days of the initiation of such an agreement. This description shall be presented on the DD Form 1498 and sent to the following address, with a copy to the ONT-26 address in paragraph 3.u:

Defense Technical Information Center
Code DTIC-H
Cameron Station
Alexandria, VA 22304-6146

(b) Options for Navy Components

Under CRDAs Components May:

(1) Grant or agree in advance to grant, to a collaborating party, patent licenses or assignments, or options thereto, in any invention made in whole or in part by a Federal employee under an agreement, retaining a non-exclusive nontransferable, irrevocable, paid-up, worldwide license to practice the invention or have the invention practiced throughout the world by or on behalf of the Government and such other rights as the DON Component deems appropriate.

(2) Waive, subject to reservation by the Federal Government of a non-exclusive, irrevocable, paid-up, worldwide license to practice an invention or have the invention practiced throughout the world by or on behalf of the Government, in advance, in whole or in part, any right of ownership which the Federal Government may have to any subject invention made under an agreement by a collaborating party or employee of a collaborating party, and

(3) To the extent consistent with established DON Component requirements and standards of conduct, permit employees or former employees to participate in efforts to commercialize inventions made while in U.S. Government service subject to national security considerations.

(4) Choose to take the further step of negotiating an EXCLUSIVE license with the company partner, usually for a limited term, and normally for negotiated royalty payments to the Government.

4. Guidance for Preparation of CRDAs

Attachment 3 has been prepared to provide more specific guidance in the preparation of CRDAs.

- Ref:
- (a) Public Law 96-480, "Stevenson-Wydler Technology Innovation Act of 1980,": 21 Oct 80, as amended by Public Law 99-502, "Federal Technology Transfer Act of 1986," 20 Oct 86
 - (b) Executive Order 12591, "Facilitating Access to Science and Technology," 10 Apr 87
 - (c) DoD 3200.12-R-4 of 27 Dec 88, Domestic Technology Transfer Program Regulation (NOTAL)
 - (d) SECNAVINST 5700.16, Domestic Technology Transfer
 - (e) Public Law 101-189, "Department of Defense Authorization Act of 1990," 29 Nov 89
 - (f) SECNAVINST 5870.2D, Licensing of Government Inventions in the Custody of the Department of the Navy and Distribution of Royalties
 - (g) OPNAVINST 5540.8L of 27 June 1986, Subj: DoD Industrial Security Program
 - (h) OPNAVINST 5510.1H of 29 April 1988, Subj: Department of the Navy Information and Personnel Security Program Regulation
 - (i) SECNAVINST 5510.24E of 6 Jun 1985, Subj: International Transfer of Technology, Goods, Services and Munitions, and the Disclosure of Classified Military Information to Foreign Governments and International Organizations
 - (j) OPNAVINST 5510.161 of 29 Jul 1985, Subj: Withholding of Unclassified Technical Data from Public Disclosure
 - (k) OPNAVINST 5510.48J of 17 Aug 1983, Subj: Manual for the Disclosure of Classified Military Information to Foreign Governments and International Organizations
 - (l) USD Memo I-09/10652 of 22 Feb 1990

Attachment 1: CRDA Preparation Guidance

Attachment 2: CRDAs With Foreign Owned, Controlled, or Influenced Organizations

Attachment 3: Investigative CRDAs

APPENDIX E

NWC-CHINA LAKE COOPERATIVE R&D AGREEMENT PROCEDURES

**Cooperative Research and Development Agreement
between
Navy Component(s)
and
Partner(s)**

Article 1. Introduction. (Sample)

Under authority of the Federal Technology Transfer Act of 1986 (Public Law 99-502, 20 October 1986), the (Navy Component), which is located at _____, and the Partner(s), whose corporate headquarters are located at _____, do hereby agree and do enter into this COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENT, which shall be binding upon both parties and their assigns according to the clauses and conditions hereof and for the term and duration set herein.

Article 2. Background.

(Briefly describe background information leading to the CRDA, with reference to the technology, software, or other subject matter, and the intended roles of the Navy and partners).

Article 3. Objective.

(Cite the technical objective(s) of the CRDA and expected results. Include subsequent marketing plans, if appropriate.)

Article 4. Recitals. (Samples)

4.1. Whereas, in enacting the Federal Technology Transfer Act (Act) of 1986, the United States Congress has found that Federal laboratories' developments should be made accessible to private industry and State and local governments, and has declared that one of the purposes of that Act is to improve the economic, environmental and social well-being of the United States by stimulating the utilization of Federally-funded technology developments by such Parties;

4.2. Whereas, (state Navy Component role in developing the subject technology and general purpose of further development or R&D role.)

4.3. Whereas, (Sample: (Company) has performed extensive work in subject area and desires to support further development in conjunction with (Navy Component); or, (Navy Component) possesses valuable technical information with respect to the development and use of _____...")

4.4. Whereas, (a statement that identifies the company's appropriateness for the CRDA. E.g., "Whereas, (Company) has performed development and marketing in the field of...")

Now, therefore, in consideration of the mutual promises contained in this Agreement and for other good and valuable consideration, the participants agree to the foregoing objectives and recitals and further agree as follows:

Article 5. Definitions.

As used in this Agreement, the following terms shall have the following meanings and are equally applicable to both singular and plural forms of the terms defined: (modify and/or expand the definitions as applicable to individual CRDAs - use official definitions wherever possible)

5.1. "Agreement" means this Cooperative Research and Development Agreement (CRDA).

5.2. "Computer Software" means computer programs and computer data bases.

5.3. "Computer Software Documentation" means data including computer listings and printouts in human-readable forms which (a) documents the design or details of computer software, (b) explains the capabilities of the software, or (c) provides operating instructions for using the software.

5.4. "Data" means all recorded information of any kind of a scientific or technical nature, including, but not limited to, technical data, computer software and computer software documentation.

5.5. "Government Purpose License Rights" (GPLR) means rights to use, duplicate, or disclose Data, in whole or in part and in any manner, for Government purposes only, and to have or permit others to do so for Government purposes only. Government purposes include competitive procurement, but do not include the right to have or permit others to use Data for commercial purposes.

5.6. "Invention" means any invention or discovery which is or may be patentable under Title 35 of the United States Code.

5.7. "Made," when used in relation to any Invention, means the conception or first actual reduction to practice of such Invention.

5.8. "Patent Application" means and U.S. or foreign patent application, continuation, continuation-in-part, divisional, reissue and/or reexamination on any Subject Invention.

5.9. "Proprietary Information" means information which embodies trade secrets developed at private expense or which is confidential business or financial information provided that such information:

(a) is not generally known or available from other sources without obligations concerning its confidentiality;

(b) has not been made available by the owners to others without obligation concerning its confidentiality;

(c) is not already available to the Government without obligation concerning its confidentiality; or,

(d) has been developed independently by persons who had no access to the Proprietary Information.

5.10. "Subject Data" means all recorded information first produced in the performance of the Agreement.

5.11. "Subject Invention" means any Invention conceived or first actually reduced to practice in the performance of work under this Agreement.

5.12. (and so forth, as appropriate)

Article 6. Cooperative Effort Description.

(Consider presenting as an Appendix, to facilitate preparation, changes, and possible amendments.)

6.1. Background/Scope (brief description)

(Sample, Type 1 CRDA - co-development (and marketing) of a product): As agreed herein, the Government provides personnel, facilities, and equipment to (Company), and (Company) provides equipment and personnel to support the XXXXXX mission of the (Navy Component). The (Navy Component) shall provide personnel knowledgeable in the development of XXXXXXXX for (the technology), the (facility) and (equipment) necessary (to perform the objective). (Company) shall provide personnel knowledgeable in the development of (the technology) for (purposes of the CRDA). The (Navy Component) and (Company) shall develop, integrate, demonstrate, and evaluate (the intent of the CRDA) as a potential commercial application of their contributing technologies.

Other elements of this effective "Statement of Work" may include, but are not limited to:

6.2. Government Personnel, Facilities, and Equipment (describe what Navy Component is doing/providing).

6.3. Company Personnel, Facilities, and Equipment (describe as for Government participant).

Other elements may include: any Special Provisions; Division of Responsibilities (Navy/Company); Review of Work; Standard of Work; Loan Agreements; Reports; Maintenance; etc.

Article 7. Developed Subject Products

(Sample: Applicable to Type 2 CRDAs - co-development (and marketing) of software)

7.1. Any Subject Product(s) developed under this CRDA shall be the exclusive property of (Company). (Company) shall further develop, promote, sell, and/or support the Subject Product(s) so long as sufficient demand exists.

7.2 (Company) shall be permitted to use the following promotional definition or description, regarding the CRDA, (Software Program) and Subject Product, in its marketing efforts:

(1) Developed in cooperation with the (Navy Component) and with technical information and assistance provided by (Navy Component) under the Technology Transfer Act of 1986. This or any other statement of fact shall not be construed as an official endorsement by the Department of the Navy and shall be so stated or included in any promotional or descriptive literature. Other promotional definitions or descriptions, as appropriate, shall be submitted to (Navy Component) for prior written approval; such approval shall not be reasonably withheld.

7.3. (Company) shall not assign its right to any Subject Product(s) to any foreign corporation or foreign government without the express written consent of (Navy Component).

Article 8. Representations and Warranties.

(Samples:)

8.1. (Navy Component) hereby represents and warrants to (Company) as follows:

8.1.1. (Navy Component) is a Federal laboratory of the U.S. Navy and is wholly owned by the U.S. Government whose substantial purpose is the performance of research, development, or engineering by employees of said Government.

8.1.2. The performance of the activities specified by this Agreement are consistent with the mission of (Navy Component).

8.1.3. All prior review and approvals required by regulations or law have been obtained by (Navy Component) prior to the execution of this Agreement. The Official executing this Agreement has the requisite authority to do so. Per SECNAV Instruction 5700.16, the Chief of Naval Research has delegated signature authority to the Commanding Officer of (Navy Component).

8.1.4. (Type 2 CRDA example): (Navy Component) is the sole owner of (software) except for matter that is in the public domain or for which (Navy Component) has obtained written authorization to use and transfer such matter.

8.1.5. (Statutory compliance): (Navy Component), prior to entering into this Agreement, has given special consideration to the entering into CRDAs with small business firms and consortia involving small business firms.

8.1.6. Except as otherwise provided in this Agreement, (Navy Component) makes no express or implied warranty as to any matter whatsoever, including the conditions of research or any invention or product, whether tangible or intangible made or developed under this Agreement, or the ownership, merchantability, or fitness for a particular purpose of the research or any invention or product.

8.2. (Company) hereby warrants and represents to (Navy Component) as follows:

8.2.1. (Company), as of the date hereof, is a corporation duly organized, validly existing and in good standing under the laws of the State of XXXX.

8.2.2. (Company) has the requisite power and authority to enter into this Agreement and to perform according to the terms thereof.

8.2.3. The Board of Directors and stockholders of (Company) have taken all actions required to be taken by law, (Company's) Certificate or Articles of Incorporation, its laws or otherwise, to authorize the execution and delivery of this Agreement.

8.2.4. The execution and delivery of this Agreement does not contravene any material provision of, or constitute a material default under any material agreement binding on (Company) or any valid order of any court, or any regulatory agency or other body having authority to which (Company) is subject.

Article 9. Funding.

(Sample, if applicable; note that Government cannot provide funds to a CRDA participant.)

9.1. Payment Schedule. (Company) agrees to pay (Navy Component) the following fees/costs in accordance with the payment schedule and for the items indicated below: ...

9.2. **Insufficient and Excess Funds.** (Navy Component) is not required to continue performance under this Agreement if the funds provided by (Company) for performance by (Navy Component) are insufficient to cover (Navy Component's) costs for such performance. In the event (Company) fails to tender the Government a payment within fifteen days after its respective due date above, then (Company) shall be deemed to be in default of this Agreement. Advanced funds not expended by (Navy Component) shall be returned to (Company) upon (Navy Component's) submission of a final fiscal report to (Company).

9.3. **Accounting Records.** (Navy Component) shall maintain separate and distinct current accounts, records, and other evidence supporting all its expenditures chargeable to (Company) under this Agreement and shall retain such records for at least twenty-four (24) months after the calendar year in which such expenditures were made. (Navy Component) shall provide (Company) a report within four (4) months after completing performance under this Agreement. The accounts and records of (Navy Component) shall be available for reasonable inspection and copying by (Company).

Article 10. Title to Property.

(Sample.)

10.1. Title to and Possession of Facilities and Equipment.

10.1.1. (Company) Title. (Company) shall retain title to and possession of all property, facilities, equipment or other resources specified in Article 6 (or listed below).

10.1.2. (Navy Component) Title. (Navy Component) shall retain title to and possession of all property, facilities, equipment or other resources specified in Article 6 (or listed below).

10.2. **Title to Other Property.** All equipment developed or acquired under this Agreement shall be the property of (Navy Component) except that (Company) shall have title to the following items of equipment: ...

10.3. **Property Costs.** During the period of and upon completion of this Agreement, (Company) shall be responsible for all costs of maintenance, removal, storage, repair, and shipping of all equipment to which it retains title.

Article 11. Data and Publications.
(Sample.)

11.1. Pre-Publication Review. (Navy Component) and (Company) agree to confer, consult, and concur prior to publication, presentation, or release outside of Government or (Company) of Subject Data, to assure that no information is released which jeopardize or compromise (Company) patent rights, (Company) Proprietary Information, Militarily Critical Technology (MCT), or classified data. Each party shall be offered an ample opportunity by the other to review such Subject Data and to file patent applications in a timely manner, if it is so entitled under this Agreement.

11.2. Classified, MCT Information. All publications and presentations by (Company) of Subject Data must be unclassified material and must be cleared for public release prior to presentation or publication by cognizant (Navy Component) authority to ensure that no classified, MCT, or otherwise restricted data are included.

11.3. Subject Data Rights. (Company) shall have title to Subject Data. Government shall, upon request to (Company), have the right to review and to request delivery of all Subject Data. (Company) shall deliver Subject Data within two weeks from the request for same by Government. Except as otherwise provided in this Agreement, (Company) grants to Government and Government shall have Government Purpose License Rights (GPLR) in any and all Subject Data for five years from the date of creation of the Subject Data; thereafter, GPLR shall expire and Government shall have unlimited rights in Subject Data. (Company) shall be obligated to deliver to Government all Subject Data requested by the Government prior to completion of performance under this Agreement.

11.4. Subject Data. (Sample for Type 2 CRDA.)

11.4.1. Subject Data which is required to be delivered to (Company) under this Agreement shall be the property of (Company). Subject Data shall be protected by (Navy Component) from release under the FOIA for a period of up to five years in accordance with Public Law. (Company) shall, upon request, have the right to review all Subject Data first produced under this Agreement which has not been delivered to (Company), except to the extent that such Subject Data is subject to a claim of confidence or privilege by a third party.

11.4.2. (Navy Component) agrees that any Proprietary Information furnished by (Company) to (Navy Component) under this Agreement, or in contemplation of this Agreement, shall be used reproduced and disclosed by (Navy Component) only for the purpose of carrying out this Agreement, unless consent to such release is obtained from (Company). (Company) shall place a proprietary notice on all information it delivers to (Navy Component) under this Agreement which it asserts is proprietary.

11.4.3. (Navy Component) shall have the right to use all Subject Data for any Governmental purpose, but shall not release such Subject Data publicly except:

11.4.3.1. (Navy Component) in reporting on the results of sponsored research may publish Subject Data in technical articles and other documents, to the extent it determines to be appropriate, and

11.4.3.2. (Navy Component) may release such Subject Data where such release is required pursuant to a request under the Freedom of Information Act (5 USC Section 552). (Navy Component) shall notify (Company) promptly of any such request for release of Subject Data information, and provide the names and addresses of the persons or entities making the request.

11.4.4. (Navy Component) and (Company) agree to confer and consult prior to the publication of Subject Data to assure that no Proprietary Information is released and that copyrights are not jeopardized. Prior to submitting a manuscript for review which contains the results of the research under this Agreement, or prior to publication if no such review is made, each party shall be offered an ample opportunity to review such proposed publication and copyright applications in a timely manner, if it is so entitled under this Agreement.

11.5. (Company Reports). (Company) shall submit (number or frequency) written reports, and a final report, to (Navy Component) during the term of this Agreement of its work and the results being obtained and shall make available to (Navy Component), to the extent reasonably requested, other data produced by (Company) in the performance of this Agreement in sufficient detail to explain the progress of work under this Agreement.

11.6. (Navy Component) Reports. (Navy Component) shall submit (frequency or number) written reports to (Company) during the term of this Agreement on the progress of its work and the results being obtained and shall make available to (Company), to the extent reasonably requested, other data produced by (Navy Component) in the performance of this Agreement in sufficient detail to explain the progress of the work under this Agreement. (Navy Component) shall submit a final report to (Company) of its results within four months after completing its performance under this Agreement.

11.7. (Company) shall place a Proprietary notice on each page of all information it delivers to the (Navy Component) under this Agreement which (Company) asserts are proprietary. The (Navy Component) agrees that any information designated as proprietary shall be used only for the purposes of this Agreement.

11.8. The (Navy Component) data provided to (Company) under this Agreement shall not be publicly released without permission from the Government unless such data is available to the public under the provisions of the Freedom of Information Act.

Article 12. Copyrights.

(Sample, if applicable, for Type 2 CRDAs)

12.1. (Company) shall copyright every Subject Product developed pursuant to this CRDA, which is subject to being copyrighted under Title 17, U.S. Code, and to which it is entitled to seek a copyright.

12.2. On any copyrights received by (Company) on any Subject Product(s), (Company) shall grant to the U.S. Government, or to Contractors acting on behalf of the U.S. Government, a nonexclusive, nontransferable, irrevocable license to use the copyrighted Subject Product free of royalties at the appropriate Government or Contractor facility.

12.3. (Company) shall include the following statement on any mask work or work of authorship created in the performance of this Agreement:

"The U.S. Government has a copyright license in this material pursuant to a CRDA with (Navy Component).

Article 13. Royalties.

(Sample, Type 2 CRDA.)

13.1. (Navy Component) shall receive a royalty of fifteen percent (15%) of the selling price of any Subject product sold by (Company), affiliates of (Company), and/or licensees of (Company), to any other person, company, or corporation except the U.S. Government or Contractors acting on behalf of the U.S. Government, and for which payment has been collected. If (Company) decides to license or in any way transfer its rights to the Subject Product(s) to another person or corporation, (Company) agrees to notify and bind, through written contract, that person, company or corporation to the provisions of this Article.

13.2. Selling price as in Article 13.1 means the sum of all charges invoiced by (Company), authorized (Company) dealers, and/or licensees of (Company), and for which payment has been collected, to customers for and Subject Product(s) less:

13.2.1. Normal trade, case, promotional, site licensing and quantity discounts actually allowed to (Company) customers, defined as end users, educators, evaluators, dealers, and distributors;

13.2.2. Expenses of transporting shipment between (Company), affiliates of (Company), and/or licensees of (Company) and customers;

13.2.3. Premiums or insurance against loss and damage in transit;

13.2.4. Credits or refunds actually allowed for spoiled, damaged, outdated, or returned goods;

13.2.5. Sales or other excise taxes imposed and paid directly with respect to the sale; and,

13.2.6. Costs associated with collection of payments and bad debt arising from the sale of any Subject Product, including amount invoiced if not collectible.

13.3. Royalties shall not be paid on transfers of any Subject Product(s) between (Company), authorized (Company) dealers, or licensees of (Company) and the U.S. Government or Governmental Contractors. The selling price shall be reduced by the amount of the royalty.

13.4. On or before 30 days following the three (3) month period after the initial release of the Subject Product and thereafter on or before every 30 days following a three (3) month period (quarterly) throughout the term of this CRDA, (Company), affiliates of (Company), and/or licensees of (Company) shall deliver to (Navy Component) a written statement of account, showing the selling price, as defined in Article 13.2, of all Subject Products sold, and for which payment has been collected, during the preceding three-month period, as calculated in accordance with the preceding Articles. If (Company), affiliates of (Company), and/or licensees of (Company) have not sold or collected payment for any Subject Product(s) during a three-month reporting period, (Company), affiliates of (Company), and/or licensees of (Company) will submit a statement to that effect.

13.5. Royalty payments not received by (Navy Component) by the due date shall be subject to interest charges computed at a rate equal to those established by the Federal Government Prompt Payment Act.

Article 14. Patent Rights.

14.1. Reporting of Inventions. Agreement participants shall each maintain a system for reporting Subject Inventions to their respective personnel responsible for patent matters and shall require their employees to file invention disclosures describing and Subject Inventions with such patent personnel within ninety (90) days from the date of conception or reduction to practice, whichever occurs first. Each participant shall, in writing, promptly provide to the other a copy of the invention disclosure describing and Subject Invention made by one or more of its employees. The invention disclosure shall be sufficiently complete so that the receiving participant may evaluate the Subject Invention to determine its operation, component parts, steps of implementation, uses, and potential patentability. For the purposes of Article 14.1, "promptly" means within ninety (90) days from receipt by its aforesaid patent personnel of a complete invention disclosure or no later than 45 days before a statutory bar date, whichever is earlier.

14.2. The (Navy Component), on behalf of the Government, waives any rights to title the Government may have in Subject Inventions made solely by (Company) employees and agrees that (Company) shall have the option to retain title in any subject Invention made solely by (Company) employees. (Company) shall notify the (Navy Component) promptly upon making this election and agrees to timely file patent applications on such Subject Invention at its own expense. (Company) agrees to grant to the Government, a non-exclusive, irrevocable, paid-up, worldwide license in the application(s) and patent(s) covering a Subject Invention made solely by (Company) employees, to practice or have practiced the Invention throughout the world by, or on behalf of the Government, and such other rights as may have been set out previously, hereto. Such non-exclusive license shall be evidenced by a license agreement prepared by (Company) in a form satisfactory to the (Navy Component). The (Navy Component), on behalf of the Government, shall have the initial option to retain title to each Subject Invention made solely by Government employees and in each Subject Invention made jointly by (Company) and employees and Government employees. In the event that the (Navy Component) informs (Company) that the Government elects to retain title to such joint Subject Invention, (Company) agrees to assign to the Government whatever right, title and interest (Company) has in and to such joint Subject Invention. As set out in Article 15 herein, the (Navy Component) agrees to negotiate an exclusive patent license to (Company) relating to such a joint Subject Invention.

The party ("Party ") having the right to retain title and file patent applications on a specific Subject Invention may elect to file patent applications thereon provided Party A so advises the other party ("Party B") within ninety (90) days from the date Party A reports the Subject Invention to Party B. Thereafter, Party B may elect to file patent applications on such Subject Invention if Party A has not advised Party B of its election to file and Party A agrees to assign Party A's right, title, and interest in such Subject Invention to Party B subject to Party A's retention of a nonexclusive, irrevocable, paid-up license to practice, or have practiced the Subject Invention throughout the world; and Party A shall cooperate with Party B in the preparation and filing of patent applications thereon.

14.3. Assignment and Transfer. No license described in Article 14.2 above shall be assigned, licensed, or otherwise disposed of, except to the successor of that part of (Company's) business to which such license pertains.

14.4. Power to Inspect. Each participant that files a Patent Application on any Subject Invention grants to the other participants the power to inspect and make copies of any Patent Application or Patent Application files on such Subject Invention.

14.5 Assistance and Cooperation. Each participant agrees to provide the other with all reasonable assistance in obtaining patent protection and preparing and prosecuting any Patent Application filed by other participant(s), and shall cause to be executed licenses, powers to inspect and make copies, and all other instruments and documents as the other participant(s) may consider necessary or appropriate to carry out the provisions of this Article 14. The participant filing a Patent Application on any Subject Invention shall, within six months of the filing date of the application, provide to the other participant(s) a copy of and the serial number of each such Patent Application.

14.6. Patent Costs. It is agreed that the participant that prepares, files, prosecutes, and/or maintains any Patent Applications and/or patents on jointly owned Subject Inventions shall bear all the costs of doing so.

Article 15. Exclusive License. (Sample, Type 1 CRDA.)

15.1. The (Navy Component), on behalf of the Government, hereby agrees to negotiate to (Company) an exclusive license in each United States patent application, and patents issued thereon, covering a Subject Invention made jointly by employees of (Company) and the (Navy Component), which is filed by the (Navy Component) on behalf of the Government, subject to the reservation of the Government's irrevocable and royalty-free right to practice and have practiced the Subject Invention on behalf of the Government, and such other terms and conditions as are specified by the (Navy Component) in such exclusive license.

15.2. Upon filing by the (Navy Component) of a patent application on Subject Invention made jointly by employees of (Company) and the (Navy Component), (Company) shall have the option to acquire a limited term exclusive license in the application and the resulting patent(s) at reasonable royalty rates. No license will exist until its terms are reduced to writing and executed by the parties. The specific royalty rate and term of exclusivity shall be negotiated promptly after the Subject Invention is filed in the United States Patent and Trademark Office, provided, however, that this option must be exercised by (Company) by written notice to the (Navy Component) within three months from the date the patent application is filed.

Article 16. Disposal of Toxic Wastes.
(Sample, if applicable.)

(Company) shall be responsible for the removal of any and all toxic or other material used, provided, or generated in the course of performing this Agreement. (Company) shall obtain at its own expense all necessary permits and licenses as required by local, State, and federal law and shall conduct such removal in a lawful and environmentally responsible manner.

Article 17. Noncompeting.
(Sample.)

The participation of (Navy Component) in this Agreement with (Company) does not compete with the capability of private industry to perform the same services because (Navy Component) is providing (description of technology/software/facility) unique to the Navy for utilization in this Agreement.

Article 18. Entire Agreement.

This Agreement constitutes the entire agreement between the participants concerning the subject matter hereof and supersedes any prior understanding or written or oral agreement relative to said matter.

Article 19. Governing Laws.

The participants agree that United States Federal Law shall govern this Agreement for all purposes, including, but not limited to, determining the validity of this Agreement, the meaning of its provisions, and rights, obligations and remedies of the participants. To the extent no Federal law exists on the subject, (State) Law shall apply.

Article 20. Disputes.

(Sample.)

Before (Navy Component) or (Company) may bring suit in any court concerning an issue relating to this CRDA, such participant must: (1) seek in good faith to resolve the issue through negotiation or other forms of nonbinding alternative dispute resolution mutually acceptable to the participants, and (2) submit the issue to the superior of the Navy signatory of this CRDA for resolution.

Article 21. Termination.

(Sample.)

21.1. Mutual Consent. (Company) and (Navy Component) may elect to terminate this Agreement at any time by mutual consent. In such event the parties shall specify the disposition of all inventions and other results of work accomplished or in progress, arising from or performed under this Agreement, and they shall specify the disposition of all property in a manner consistent with this Agreement and any license hereunder.

21.2. Unilateral Action. Either party may unilaterally terminate this entire Agreement at any time by giving the other participant(s) written notice, not less than thirty (30) days prior to the desired termination date. If (Company) unilaterally terminates this Agreement, any exclusive license entered into by the parties shall be simultaneously terminated unless the participants agree to retain such exclusive license.

21.3. New Commitments. The (Navy Component) shall make no new commitments after receipt of a written termination notice from (Company) and shall, to the extent practicable, cancel all outstanding commitments by the termination date.

Article 22. Assignment/Subcontracting.

(Sample.)

22.1. Except as otherwise provided in this Agreement, neither this Agreement nor any license acquired by any participant hereunder shall be assigned or otherwise transferred by any participant without the prior written consent of the other participant(s), except to the successor of that of (Company's) business to which this Agreement or such license pertains.

22.2. Should (Company) become foreign-owned, foreign-controlled, or foreign-influenced, then (Company) shall immediately notify (Navy Component) of this situation. (Navy Component) shall in turn promptly notify ONT Code 26, who will then determine whether any action is appropriate, depending on the specific circumstances.

Article 23. Severability.

The illegality or invalidity of any provisions of this Agreement shall not impair, affect or invalidate the other provisions of this Agreement.

Article 24. Headings.

Title and headings of the sections and subsections of this Agreement are for convenience of reference only and do not form a part of this Agreement and shall in no way affect the interpretation thereof.

Article 25. Officials not to Benefit.

No member of or delegate to the United States Congress, ^{or President's Commission} shall be admitted to any share or part of this Agreement or to any benefit that may arise therefrom.

Article 26. Independent Contractors/Entities.

The relationship of the participants to this Agreement is that of independent contractors and not as agents of each other or as joint venturers or partners. The (Navy Component) shall maintain sole and exclusive control over its personnel and operations.

Article 27. Use of Name or Endorsements.

(Company) shall not use the name of (Navy Component) or any other Government entity on any product or service which is directly or indirectly related to either this Agreement or any patent license or assignment associated with this Agreement without the prior approval of (Navy Component). By entering into this Agreement, (Navy Component) does not directly or indirectly endorse any product or service provided, or to be provided, by (Company), its successors, assignees, or licensees. (Company) shall not in any way imply that this Agreement is an endorsement of any such product or service.

Article 28. Waivers.

None of the provisions of this Agreement shall be considered waived by any participant unless such waiver is given in writing to all other parties. The failure of any party to insist upon strict performance of any of the terms and conditions hereof, or failure or delay to exercise any rights provided herein or by law shall not be deemed a waiver of any right of any participant hereto.

Article 29. Force Majeure.

No participant shall be liable for the consequences of any unforeseeable force majeure event that (1) is beyond their reasonable control, (2) is not caused by the fault or negligence of such participant, (3) causes such participant to be unable to perform its obligations under this Agreement and (4) cannot be overcome by the exercise of due diligence. In the event of the occurrence of a force majeure event, the participant unable to perform shall promptly notify the other participant(s). It shall further pursue its best efforts to resume as quickly as possible and shall suspend performance only for such period of time as is necessary as a result of the force majeure event.

Article 30. Liabilities. (Sample.)

30.1 Government Liability for Company Property. The Government's responsibility for damages to or for the maintenance of any property (Company) provides to (Navy Component) or any (Company) property acquired by (Navy Component) or property developed pursuant to this Agreement will be in conformance with governing laws.

30.2. Indemnification by Company. (Company) holds the Government harmless and agrees to indemnify the Government for all liabilities, claims, demands, damages, expenses, and losses of any kind arising out of the performance by (Company) or other entity acting on behalf of or under the authorization of (Company) to this Agreement, and for all liabilities, claims, demands, damages, expenses, and losses of any kind arising out of the manufacture, use, sale, or other disposition by (Company) or other entity acting on behalf of or under the authorization of (Company) of any machines, articles of manufacture, products, processes, compositions of matter, data, or developments of any kind made under or used in the performance of this Agreement.

30.3. Limits of Liability. Notwithstanding any and all other provisions of this Agreement, the Government shall not be liable to (Company) for any loss of revenue, profits, or other indirect or consequential damages.

Article 31. Covenant Against Contingent Fees.

(Company) warrants that no person or agency has been employed or retained to solicit or secure this CRDA upon agreement or understanding for a commission, percentage, brokerage or contingent fee, except bona fide employees or bona fide established commercial or selling agencies maintained by (Company) for securing business. For breach or violation of this warranty, (Navy Component) shall have the right to annul the CRDA without liability, or, in its discretion, to add to the CRDA consideration of, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

Article 32. Covenant Against Gratuities.

(Navy Component) may, by written notice to (Company), terminate this CRDA if it is found, after notice and hearing, by the Secretary of Defense, or his duly authorized representative, that gratuities (in the form of entertainment, gifts, or otherwise) were offered or given by (Company) or any agent or representative of (Company) to any officer or employee of (Navy Component) with a view toward securing a contract or an agreement, or securing favorable treatment with respect to the awarding or amending, or the making of and determination with respect to the performing of such contract or agreement, provided that the existence of the facts upon which the Secretary of Defense, or his duly authorized representative, makes such finding shall be in issue and may be reviewed in any competent United States Court.

Article 33. Notices.

All notices pertaining to or required by this Agreement shall be in writing and shall be signed by an authorized representative and shall be delivered by hand or sent by certified mail, return receipt requested, with postage prepaid, addressed as follows:

If to (Company): ...

If to (Navy Component):...

Any participant may change such address by notice given to the other participant(s) in the manner set forth above.

Article 34. Amendments.

If any participant desires a modification in this Agreement, the Participants shall, upon reasonable notice of the proposed modification by the participant desiring change, confer in good faith to determine the desirability of such modification. Such modification shall not be effective until a written amendment is signed by the Agreement signatories or their successors.

Article 35. Duration of Agreement and Effective Date.

(Sample.)

35.1. This Agreement shall terminate (time) after its effective date, but the provisions of (specify Article(s)) shall survive this Agreement.

35.2. It is agreed that the following Articles shall survive this Agreement: __, __, __, __, and __.

35.3. This Agreement shall enter into force (number) days after (or on the day of) the last signature of the participants.

35.4 Entered into this __ day of _____ 19__, for
(Company)

For the Department of the Navy:
Approved this __ day of _____ 19__,

By: _____

CRDAs WITH FOREIGN OWNED, CONTROLLED OR INFLUENCED
(FOCI) U. S. ORGANIZATIONS

1. INTRODUCTION

Navy components are permitted and encouraged to enter into unclassified and classified CRDAs under references (a)-(e), provided that classified and unclassified sensitive information protected by law, regulation, or Executive Order shall be appropriately safeguarded. Permissible United States CRDA partners are: other Federal agencies; units of State and local government; industrial organizations (including corporations, partnerships, and limited partnerships, and industrial development organizations); public and private foundations; nonprofit organizations (including universities); other persons (including licensees of inventions owned by the Federal agency); and foreign-owned U.S. companies (the latter is the subject of this attachment). Such agreements shall advance a component's program missions, and it is highly desirable that they also have applicability for potential spin-off benefits to the U.S. public and/or private sectors.

2. PRINCIPLES INVOLVED IN CRDAs WITH FOCI COMPANIES

a. The Avoidance of Detrimental Economic Impact from CRDAs with FOCI U.S. Companies

Sections 2 and 11 of reference (b) of the basic letter (the "Technology Transfer Act" as amended) contain information that underlies the Navy's instructions regarding CRDAs with foreign owned, controlled or influenced (FOCI) U. S. companies, as regards the avoidance of detrimental economic impact from CRDAs.

Section 2(5) and 2(6) point out that: industrial and technological innovation in the United States may be lacking compared to historical patterns and other industrialized nations (emphasis added); and increased technological innovation would reduce trade deficits, stabilize the dollar, increase productivity gains, increase employment, and stabilize prices (emphasis again added). These sections emphasize the need to ensure that any impact of CRDAs on the U.S. economy is positive.

Section 11 (c) (4) (B) is quoted here in its entirety, as establishing the basic principle for the Navy's implementation:

"(4) The laboratory director in deciding what cooperative research and development agreements to enter into shall.... -

(B) give preference to business units located in the

United States which agree that products embodying inventions made under the cooperative research and development agreement or produced through the use of such inventions will be manufactured substantially in the United States and, in the case of any industrial organization or other person subject to the control of a foreign company or government, as appropriate, take into consideration whether or not such foreign government permits United States agencies, organizations or other persons to enter into cooperative research and development agreements and licensing agreements" (emphasis added).

These concepts dictate economic considerations for potential CRDAs with FOCI U.S. companies. In addition, security considerations must be taken into account.

b. Security Considerations for CRDAs with FOCI U.S. Companies

FOCI U. S. Companies that have one of the facility security clearances described in Section 4 below may be considered for CRDAs that involve classified material, or unclassified sensitive material (or, of course, unclassified information that is not sensitive militarily critical).

FOCI U.S. companies that are not covered by one of the facility clearances described in 4 below may be considered only for unclassified CRDAs that do not involve sensitive, militarily critical information; further, the procedures of 6 are to be carried out.

3. CONDITIONS FOR AVOIDANCE OF DETRIMENTAL ECONOMIC EFFECTS

A FOCI U.S. company that has one of the facility security clearances detailed in 4 below has, in the process of qualifying for the clearance, automatically met the requirements for the avoidance of a detrimental economic effect (in addition to having met the security requirement), and is qualified for consideration for a CRDA.

A FOCI U.S. company that is not covered by one of the facility security clearances in 4 below must meet the requirements in 5 below, which cover actions to be taken by the foreign country involved, the FOCI U.S. company, and the Navy component, to establish that no economic effect detrimental to the U.S. will result from the carrying out of the CRDA.

4. DEPARTMENT OF DEFENSE POLICY ON RELEASE OF DATA TO FOCI U.S. COMPANIES

USD Memo I-90/10652 of 22 Feb 1990 clarifies Department of Defense (DOD) policy on the release of export controlled

technical data to foreign-owned U.S. firms. It specifically applies to contractors, but applicability is extended to CRDA participants. It provides that:

a. Such companies are not foreign companies. They are incorporated in the U.S. and are subject to U.S. laws and regulations, including the Arms Export Control Act (AECA) and Export Administration Act (EAA).

b. There are no restrictions on release to these companies of unclassified technical data controlled by the AECA or EAA, provided access within the company is limited to U.S. citizens and intending citizens (formerly immigrant aliens). Any U.S. company, foreign-owned or U.S.-owned, must obtain the appropriate license or other written U.S. Government approval before the technical data can be exported or provided to foreign national employee or other foreign person.

c. Decisions on the release of classified technical data to foreign-owned U.S. companies are dependent on the type of information involved and type of facility security clearance under which the company is operating, as specified in DoD 5200.22-R, Industrial Security Regulation. The most frequently employed arrangements to mitigate or negate foreign control or influence are described below:

(1) The voting trust is used to transfer legal control of a company to trustees who are U.S. citizens. Under this arrangement the foreign owner retains equity ownership rights; however, the company is insulated from the foreign control and influence. Foreign nationals cannot have access to classified information or supervise classified contracts (or CRDAs). There are no restrictions on access to classified information provided the firm is cleared at the appropriate level and requires access to perform on a government contract (or CRDA).

(2) The proxy arrangement provides for the voting rights of stock owned by the foreign interests to be conveyed to proxy holders by means of an irrevocable proxy agreement. Legal title remains with the foreign interests but the company is nevertheless insulated from foreign control and influence.. This arrangement, and access to classified information, otherwise is similar to the voting trust arrangement.

(3) The special security agreement is a mechanism which allows the foreign parent firm to exercise general management of the company. However, the company must be managed by U.S. citizens and foreign nationals cannot have access to classified information or supervise classified contracts. Special security agreements require a determination by the sponsoring Component that the arrangement is in the best interest of the U.S.

(4) A company may be eligible for a reciprocal facility security clearance when the foreign ownership, control, or influence stems from a country with which the U.S. has concluded a government-to-government security agreement that provides for this type of arrangement. Because foreign ownership or control remains in place, and foreign nationals may be employed by the company, reciprocally cleared companies may only have access to classified information determined to be releasable to the government of the ultimate parent company.

d. In summary, a foreign-owned U.S. company that has been cleared under (1) a voting trust, (2) a proxy arrangement, or (3) a special security agreement may compete, without any further determinations, for U.S. classified defense contracts and may participate in CRDAs. Only in the case of (4), a reciprocally cleared firm, is a "foreign disclosure" decision required.

5. CONDITIONS FOR A CRDA WITH A FOCI U.S. COMPANY COVERED UNDER SECTION 4

Because of the militarily critical nature of R&D performed by the Navy, Navy components are permitted to enter into classified CRDAs, or CRDAs involving unclassified sensitive, militarily critical information, with industrial organizations or persons, including academic institutions, subject to the control or influence of a foreign company or government, ONLY in cases where those organizations, persons or institutions qualify for access to such information under the provisions of paragraph 4.

6. CONDITIONS FOR A CRDA WITH A FOCI U.S. COMPANY NOT COVERED UNDER SECTION 4

Provided conditions a. through f. below are met, it may be beneficial for Navy components to enter into unclassified CRDAs involving no sensitive, militarily critical information with ANY industrial organization or other person subject to the control of a foreign company or government. Naval activities faced with carrying out these provisions are advised that there are no official forms or structures for them. Preparers of CRDAs requiring these procedures should complete the information to the best of their ability, and with the cooperative assistance of the FOCI partner and its parent. Communication with ONT Code 26 (Dr. R. M. Culpepper) is suggested in case of difficulties.

A description in writing of the actions taken, or of the situation that exists, as appropriate, in response to items a. through f. below, is to be submitted to ONT 26 separately from and preferably prior to, the submission of the CRDA.

a. Adherence to DoD Directives:

1. All agreements shall adhere to DODD 2040.2 (International Transfers of Technology, Goods, and Munitions).

2. Any agreement with a foreign government, international organization, or any other entity or establishment owned or controlled by a foreign government or international organization, which is subject to DODD 5530.3, "International Agreements," shall be processed in accordance with that directive.

b. Requirements regarding the Foreign Country involved:

1. The Navy component shall consider, in consultation with the U.S. Trade Representative, whether the foreign government involved has adopted adequate measures to prevent the transfer of strategic technology to destinations prohibited under such national security export controls, either through participation in the Coordinating Committee for Multilateral Export Controls (COCOM) or through other international agreements to which the U. S. and such foreign governments are signatories (where cooperative research might involve data, technologies, or products subject to such controls under U.S. laws).

2. The Navy component shall consider whether the foreign participant's home market affords reciprocal treatment to U.S. companies comparable to that afforded the foreign participant in the U. S., as evidenced by:

(i) affording comparable opportunities for U.S. laboratories to participate in any joint ventures similar to CRDAs;

(ii) encouraging local investment opportunities for U.S. companies that are comparable to investment opportunities for foreign companies in the U.S.; and,

(iii) affording adequate and effective protection for the intellectual property rights of U.S. companies.

c. Requirements on the FOCI U.S. Company

1. The FOCI U.S. company must be prepared to make substantive contributions to the proposed CRDA, and the sponsoring Navy component must certify that the foreign contribution and participation in the CRDA would be in U.S. interests.

2. The FOCI U.S. company must have already made and agrees to continue to make a substantial commitment to the U.S. market, as evidenced by (1) investments in the U.S. in long-term research, development, and manufacturing (including the domestic manufacture of major components and subassemblies); (2) significant contributions to employment in the U.S.; and (3) agreement, with respect to any technology arising from the joint venture to manufacture within the U.S. products resulting from that technology, to procure parts and materials from competitive North American suppliers, and to support a North American supplier infrastructure.

3. The parent and affiliate organizations of the FOCI U.S. company shall not have been identified on two or more occasions within the previous five years as a foreign manufacturer, producer, or exporter within the meaning of section 771(9)(A) of the Tariff Act of 1930 (19 U.S.C. 1677(9)(A) in proceedings that have resulted in or involved a final dumping or countervailing duty determination;

d. Requirements on the Navy Component

1. The sponsoring Navy component shall prepare a strategy or plan for U.S. utilization/development that capitalizes on U.S. involvement to avoid foreign gain at U.S. expense.

2. The sponsoring Navy component shall monitor and report the performance of any of its respective foreign company CRDA participants to the ASN(RE&S), and shall suspend further participation by that company in the CRDA if the Navy determines that the foreign company or its home market fail to satisfy any of the criteria set forth above.

e. Requirements to be Included in the Agreement

1. All agreements require signature authority from the CNR.

2. All agreements shall ensure that intellectual property rights are properly protected.

3. All agreements shall ensure that access to R&D opportunities and facilities, and the flow of scientific and technological information, are, to the maximum extent practicable, equitable, and reciprocal for both parties.

4. Agreement conditions shall ensure appropriate control or release of CRDA intellectual property rights and results/"products" to protect or enhance U.S. interests.

f. Requirements from OCNB

The DON may specify other terms and conditions as deemed appropriate on a case-by-case basis.

INVESTIGATIVE CRDAs(1) Background

Non-U.S. Government organizations may be interested in conducting studies or investigations pertaining to Navy needs and requirements related to future bidding interests. Such efforts are of potentially greater value if conducted with access to DoD scientific, technical, and planning information. They may also benefit by including some limited degree of consultation with DON personnel, but do not otherwise require any Government services, facilities, equipment or other resources. To service this interest, DON Components may utilize investigative CRDAs. While these are similar in scope to Navy Potential Contractor Program (NPCP) agreements, they have the additional advantage of allowing Navy consultative services, and may include reporting requirements for the non-Government participant. As a special category of CRDAs, the following guidance applies.

(2) Objective

The objective of investigative CRDAs is to facilitate information access and exchanges, including software, between the participating non-Government organization and sponsoring DON Component, in addition to permitting limited associated DON technical consultation. The exchange of, or access to, equipment, services, facilities, funds, or other resources by either party is excluded. This expedites the required negotiation and approval process, which may take longer with the other types of CRDAs that involve such resources. Unless otherwise directed, approving authority for investigative CRDAs remains as specified in paragraph 1.(c).(i) of the Guidance.

(3) Conditions

The sponsoring DON Component shall advise the non-Government participant that no contractual obligation or commitment to a future contract is assumed or implied on the part of the Government in furnishing documents and information under an investigative CRDA. The DON sponsor shall also advise that participation in an investigative CRDA and consequent receipt of Government documents in no way obligates an organization to furnish reports, articles, services, or proposals to the Navy other than as prescribed in the agreement, nor does it constitute a basis for a claim against the Government.

(4) Requirements to Qualify

In order to qualify to participate in an investigative CRDA, applicants must:

(a) provide evidence of capability to perform needed research and/or development that has reasonable potential for eventually supporting a Navy need or requirement.

(b) submit a proposed use statement (description of proposed cooperative effort), subject to negotiation, describing how the desired information will support Navy needs or requirements in a specified area within the applicant's capability and interest. In order to substantiate need-to-know and evaluate investigative CRDA effectiveness, issuing DON Components are required to request written reports and explanations of the intended use, and benefits to be derived from, the disclosed information.

(5) Participants must register for DoD information services by contacting the Defense Technical Information Center (DTIC) at (703) 274-6871 to obtain the requisite application instructions and forms. As part of the registration process, and as necessary and appropriate for performance of the CRDA, the sponsoring DON Component will certify a DD Form 1540, Registration for Scientific and Technical Information Services for access to information in technical areas relevant to the CRDA. If the potential participant does not have an existing facility clearance, the sponsoring DON Component must determine if it is in the best interests of the Navy to endorse the need for one.

(6) The DTIC registration package also contains information on the DD Form 1541, Facility Clearance Register, that is required if an organization is to obtain classified information.

(4) Procedure

The general format presented in Attachment 1 (the Preparation Guidance) should be followed in preparing an Investigative CRDA. However, because of the absence of any involvement of equipment, services, facilities, funds or other resources, many of the articles may be omitted. In particular those articles related to the items just mentioned are irrelevant to an Investigative CRDA, such as Articles 7, 9, 10, 12, 13, 14, 15, 16, 22, and 27.

COOPERATIVE R&D AGREEMENTS PROCEDURES

The Federal Technology Transfer Act of 1986 states, in part:

"Many new discoveries and advances in science occur in universities and federal laboratories, while the application of this new knowledge to commercial and useful public purposes depends largely upon actions by business and labor. Cooperation among academia, federal laboratories, labor, and industry, in such forms as technology transfer, personnel exchange, joint research projects, and others, should be renewed, expanded and strengthened."

The Naval Weapons Center believes this landmark legislation will help forge teamwork between the laboratories and industry. The Act also promotes teamwork. In particular, Section 11, COOPERATIVE R&D AGREEMENTS, begins a new era in relations between government laboratories and enterprising organizations by permitting the exchange of comparable resources for the common good. Section 11 of the Act states:

"A Government-operated laboratory may accept, retain, and use funds, personnel, services, and property from collaborating parties and provide personnel, services, and property to collaborating parties".

This sharing of valuable resources is the essence of teamwork and supports two teamwork axioms, namely 1) teamwork is equitable, that is, each participant gives and receives something of comparable value (quid pro quo and 2) teamwork is friendly, that is, the relationship is non-adversarial.

Consistent with the Act and command mission, NWC encourages mutually beneficial cooperative R&D efforts. Subsequent development of an agreement to pursue such efforts will normally be preceded by a preliminary inquiry of interest by the nonfederal party.

As a dedicated Navy laboratory NWC does not have, as of yet, formal mechanisms for actively marketing its skills and products. Technical visibility typically disseminates to the public by means of symposia, journal articles, and NWC publications. It is usually an initial contact resulting from one of the preceding meetings or publications that prompts an organization to inquire about a cooperative effort.

At NWC, the development of a cooperative effort follows a simple six step procedure: 1) Letter of Intent, 2) Technical Objectives Meeting, 3) Conditions of Accord, 4) Offer, 5) Command Approval, 6) Agency Approval.

1) LETTER OF INTENT

Following the inquiry about a cooperative effort, an internal Letter of Intent is sent to NWC principles. This letter affirms their desire to explore the possibility of entering into a cooperative R&D agreement with the nonfederal party. It is signed by the Principle Investigator; the First Level Supervisor, and the Second Level Supervisor and finally returned to the Technology Transfer Coordinator, Code 374.

In like manner an external Letter of Intent is sent to the inquiring party. Enclosed with this letter is a copy of the Federal Technology Transfer Act of 1986, Public Law 99-502 and brochure describing NWC. This letter is signed by at least one of the principals of the nonfederal party, affirming their wish to explore the possibility of entering into a cooperative R&D agreement with NWC. This letter is also returned to the Technology Transfer Coordinator.

Theses letters are non-binding; they neither encumber nor obligate anyone. Copies of these two letters are forwarded to: 1) Commanding Officer, 2) Technical Director, and 3) Office of Counsel. The purpose of these letters is fourfold: 1) They provide a convenient introduction to the agreement process, 2) They inform NWC executives and legal staff of impending resource allocation decisions, 3) They identify the principals in the process, and 4) They help establish commitment to the process.

2) TECHNICAL OBJECTIVES MEETING

Having established an initial interest with the Letter of Intent, the second step involves a meeting, typically at the government laboratory, to discuss and clarify three issues:

- 1) Merit of the particular technology,
- 2) Areas of common, mutually-beneficial interest, and
- 3) Content of a possible R&D effort.

NWC attendees will include, as a minimum, the Principal Investigator, the First Level Supervisor, the Second Level Supervisor, and the Technology Transfer Coordinator. Nonfederal attendees will include at least one technical representative of that organization.

The agenda will include:

- 1) Results, accomplishments, or products expected from the agreement,
- 2) Resources (personnel, equipment, funding, real property) needed in the course of executing the agreement,

3) Beginning and duration of the agreement, and

4) A decision whether to continue this agreement development process.

Depending upon the complexity of the technology and the magnitude of the proposed cooperative effort, several meetings may be necessary. These meetings do not commit any party; their purpose is primarily to establish a common ground for technical discussion.

3) CONDITIONS OF ACCORD

Since federal government approval of a cooperative R&D agreement can come only from the OCNR, it is appropriate that the offer of such an agreement be made by the nonfederal party for subsequent acceptance or rejection by the Navy. To expedite the nonfederal party's formulation of an offer, NWC provides proposal guidance with the Conditions of Accord document.

Following the discussion of technical objectives and resources requirements at the Technical Objectives Meeting, NWC will develop the Conditions of Accord. This informal document defines those conditions considered necessary for NWC participation in the research and development effort. Contents will include:

- 1) NWC technical objectives
- 2) Personnel, services, and property to be provided by the NWC
- 3) Funding, personnel, services, and property to be provided by the nonfederal party
- 4) Beginning date of agreement
- 5) Duration of the agreement
- 6) Procedure for unilaterally or bilaterally terminating the agreement
- 7) Liability issues
- 8) Proprietary issues, including allocation of intellectual property rights
- 9) Security issues

This document is forwarded promptly to the nonfederal party to assist the development of their proposal. Concurrent with the development of the Conditions of Accord, the Principal Investigator, through his first and second level supervisor, shall provide the Technology Transfer Coordinator an estimate of:

1) Aggregate NWC resource cost (personnel, services, property), and

2) Aggregate nonfederal party resource cost (funding, personnel, services, property),

The purpose of this analysis is to assure an equitable situation for both parties of the agreement, that is, the two costs should be very similar.

4) OFFER

Using Conditions of Accord as a guide, the nonfederal party will develop a cooperative research and development agreement offer and submit it to the Technology Transfer Coordinator for review.

5) COMMAND APPROVAL

The nonfederal party is not bound to the Conditions of Accord; differences between that document and the nonfederal party's offer could be subjected to either a counteroffer from NWC or negotiation. If negotiation is deemed necessary, the agreement process reverts to the Technical Objectives Meeting. Thus, upon receipt and timely review of the offer, the Technology Transfer Coordinator shall take one of four possible actions:

1) Reconvene the Technical Objectives Meeting to negotiate differences between the Conditions of Accord and the Offer, or

2) Present a counteroffer to the nonfederal party, or

3) Forward the Offer to the Commanding Officer with a recommendation for approval, or

4) Forward the Offer to the Commanding Officer with a recommendation for disapproval.

Upon approval by the Commanding Officer, the Offer will be forwarded to the OCNR with the Commanding Officer's recommendation for approval.

6) AGENCY APPROVAL

This is the final step in the agreement process. Upon OCNR's approval, the agreement shall be in effect immediately, unless otherwise specified in the agreement.

These six steps are straightforward and effective. They enable organizations to form simple partnerships with NWC for joint research, development, and commercialization of new technology.

LIST OF REFERENCES

1. Stevenson-Wydler Technology Innovation Act of 1980, Public Law 96-480, United States Congress, Washington D.C., 21 October 1980.
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3. Interview between M. MacNamera, Naval Undersea Systems Command (NUSC), Newport, Rhode Island, and the author, 10 August 1991.
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5. Naval Postgraduate School, Monterey California Draft Cooperative Research and Development Agreement (CRDA) No. NCRDA-91-NPGS-001, 10 October 1991.
6. Office of Naval Research (ONR), Draft Guidance for Cooperative Research and Development Agreements (CRDA's), Washington, D.C., 17 July 1990.

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